SCOTTISH NATURAL HERITAGE

# COMMISSIONED REPORT

Commissioned Report No. 169

# Scottish trends in vascular plants

(ROAME No. F01NB02)

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# Summary

## Scottish trends in vascular plants

**Commissioned Report No. 169 (ROAME No. F01NB02)**
**Contractor: Centre for Ecology and Hydrology, Monks Wood**
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### Background

This report provides summary information on trends in the occurrence of vascular plants in Scotland as a whole and across seven groups of habitats. Further chapters look at arable weeds and plants of base-poor substrates.

An index of change has been used as a measure of relative increase or decrease in the frequency of 1,113 plant species between two Atlas survey periods. This index compares the relative change in the number of 10km squares in which each species was recorded in 1930–1969 and in the later period 1987–99. For each species, a change index has been calculated for Scotland as a whole, and for three broad geographical regions, Highland, Eastern Arable and South.

### Main findings

- Almost half (46%) of vascular plant species, for which a change index could be calculated, showed little change in their frequency of occurrence, 27% of species increased and 27% decreased.
- Patterns of change were generally consistent among the three Scottish regions.
- Non-native species (mean change index –0.14) changed to a greater extent than native species (mean index 0.06).
- Among non-native species, those established in ancient times (before AD 1500) tended to show a decline (mean change index –0.74) whilst species that arrived more recently showed an increase (mean index 0.30).
- The rate of change varied widely among different habitats with arable weeds declining most dramatically.
- Upland species changed little in the Highlands, where only 17% of species decreased. They declined markedly elsewhere, with 33% of species decreasing in the Eastern Arable area and 38% in the South. This reflects the loss of heath and bog in the latter areas. Only five non-native species are characteristic of the uplands, but all five are invasive (mean change index 1.24).
- Grassland species showed limited changes only, with a mean change index of –0.19 (21% of species increasing and 36% decreasing). Specialist species associated with nutrient poor sites and drier soils decreased, whilst generalist species or those associated with wetter soils increased. The few non-native

grassland species decreased strongly (mean change index –0.74, with 56% of species decreasing), partly as a result of less frequent re-seeding and cleaner seed.

- Native woodland species showed little change, with a mean change index of –0.03 (21% of species increased and 25% decreased). Non-native species increased greatly (mean change index 0.51, with 49% of species increasing and 14% decreasing). This increase in non-native woodland species is not explained by the increase in commercial forestry plantations.

- Recording effort for freshwater species has increased markedly in the later survey period, with a mean change index of 0.74. Native freshwater species have similarly shown an increase (mean index 0.78) which is likely to be explained by the increase in recording effort. However, there is no doubt that Scotland retains a rich freshwater flora.

- Despite the increased recording effort described above, non-native freshwater species show only slightly more increases (38%) than decreases (31%), with a mean change index of 0.25. It therefore appears that the non-native species perhaps have done less well than their native counterparts.

- Arable weeds show a large decrease, especially the non-native species (59% of non-natives decreased compared to 48% of native species). Many of the non-natives are or were long-established.

- Coastal species, particularly those native to Scotland, showed the least change with a mean change index of –0.08 (74% species showed little or no change compared to 12% increase and 14% decrease). Some species have spread inland on salted roads. Continuation of climatic and land use changes may put pressure on coastal species in the future.

- Species that are characteristic of Built-up areas and gardens have changed relatively little, with a mean change index of 0.12 (33% increased and 27% decreased). 85% of them are non-natives, which have on balance shown a slight increase (mean index 0.32).

- Species from Linear and boundary features, of which 48% are non-natives, showed limited change, with a mean change index of –0.22 and increasing species (31%) balanced by decreasing species (29%).

- Of the 81 species associated with base-poor substrates, 54% showed little or no change, 26% showed a decrease and 20% an increase.

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## Contents

# 1 INTRODUCTION

The trends identified in this report come from a comparison of two surveys of the distribution of the flowering plants and ferns of Britain and Ireland. The initial survey covered the period 1930–69. The majority of records were collected for the *Atlas of the British Flora* (Perring & Walters 1962) in the 1950s, but the results analysed include additional records collected until the end of the 1960s. The second survey covers the period 1987–99 and is the dataset on which the *New Atlas of the British and Irish Flora* (Preston *et al.*, 2002a) is based. Both surveys were co-ordinated by the Botanical Society of the British Isles, and the aim was to record plants in all the Ordnance Survey 10km grid squares. The records from both surveys, over 9 million in total, are held in a database at the Biological Records Centre, CEH Monks Wood.

The 1987–99 survey was able to draw upon the help of more volunteer recorders than the previous Atlas. As a result, more grid squares were visited and most squares were recorded more thoroughly. Our comparison of the results of the *New Atlas* project with those of the earlier work has been corrected for differences in recording intensity by means of a change index (Telfer *et al.*, 2002). For each species, this index compares the difference in occupancy of 10km squares between the periods 1930–69 and 1987–99 with the difference in occupancy that would be expected for an average species with similar overall frequency. The change index has been calculated only for those species mapped in the 1962 *Atlas*.

- Plants with a positive change index have increased in frequency when compared to the average plant, and the larger the index, the bigger the relative increase in the number of 10km squares in which they have been recorded.
- Plants with a negative index have suffered a relative decline in frequency.

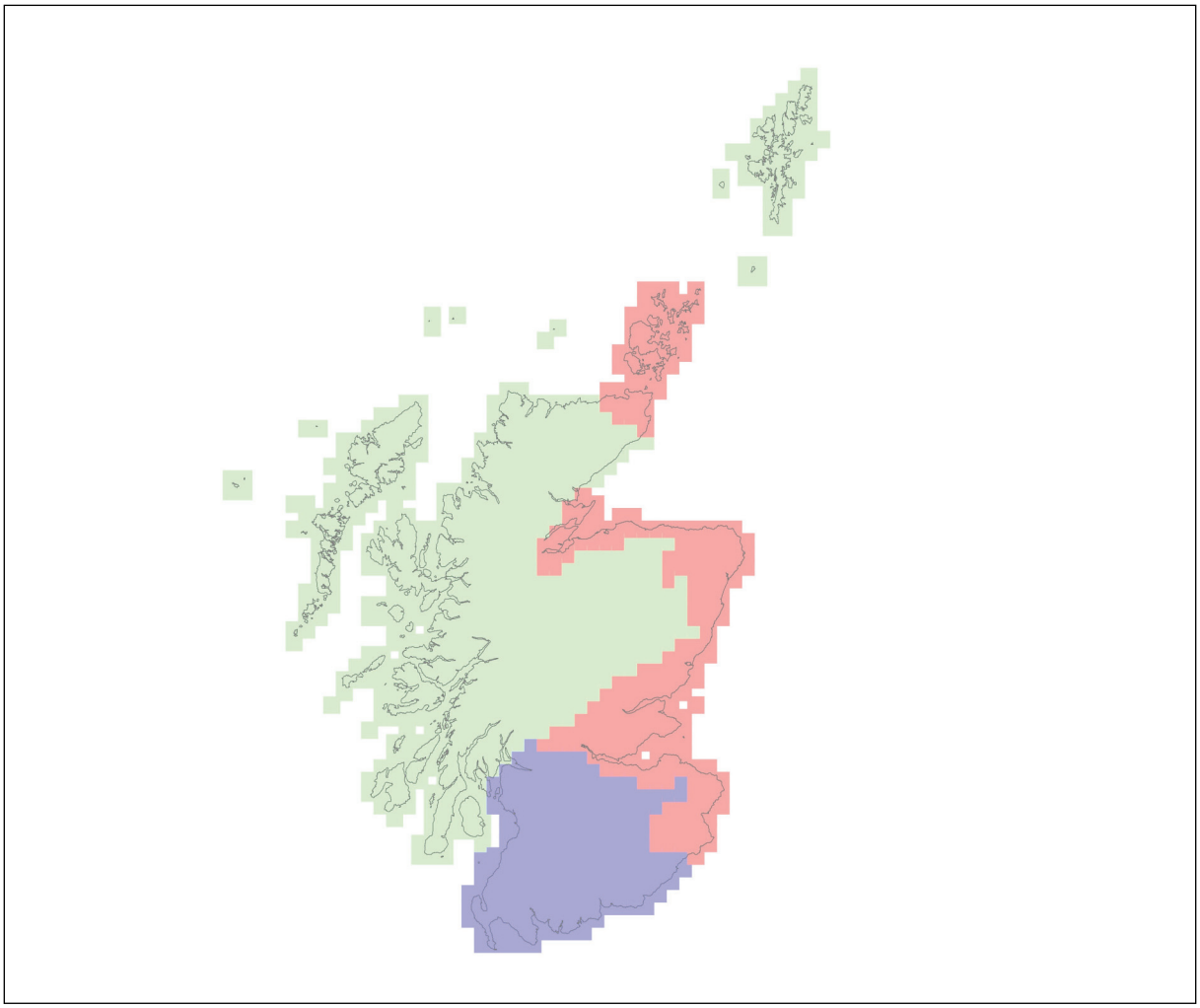
The changes have been considered in relation to species characteristic of different broad habitats and with different histories in Britain, and in relation to three different regions of Scotland.

The seven broad habitats considered are Uplands, Grasslands, Woodlands, Freshwater, Coastal, Built-up areas and gardens, Linear and boundary features. Native and non-native species of Freshwater were treated separately, and the performances of arable weeds and of species characteristic of base-poor substrates were examined.

Native and non-native species have been separated in the analysis. Two groups of non-native species are recognised: ancient introductions, believed to have been established before AD 1500 ('archaeophytes') and more recent introductions, believed to have become established more recently ('neophytes').

The three regions of Scotland considered in the analysis are mapped in Figure 1.

**Figure 1 The 10km squares comprising the three regions of Scotland: Green – Highland; Red – Eastern Arable; Blue – South Western Pasture**



# 2 VASCULAR PLANTS

The *New Atlas of the British & Irish Flora* data set (Preston *et al.,* 2002a) was used to analyse change in the occurrence of vascular plants across Scotland. Trends in the occurrence of plant species were evaluated on the basis of change indices derived for 1,113 species (Telfer *et al.,* 2002). These were based on the occurrence of plant species in 10km squares in two time spans. These indices compare the relative change in the number of 10km squares in which each species was recorded in 1930–1969 and in surveys after 1987, and have been used to determine patterns of change among 785 species native to Britain (and 328 non-native species) across seven broad habitats[1]. To evaluate whether changes in the occurrence of plant species were consistent across the whole of Scotland, separate evaluation of change indices was carried out for each of three distinct geographical regions (Highlands, Eastern Arable and South). These regions are based on groups of broadly similar geographical zones identified as part of the SNH Natural Heritage Futures programme.

## 2.1 Trends

In addition to the 1,113 species for which a change index value is available, there are 231 native species and 56 non-native species for which a change index cannot be calculated. These are very rare plants in Scotland or species which have been confused with others in the past to such an extent that it is impossible to assess trends in their distribution.

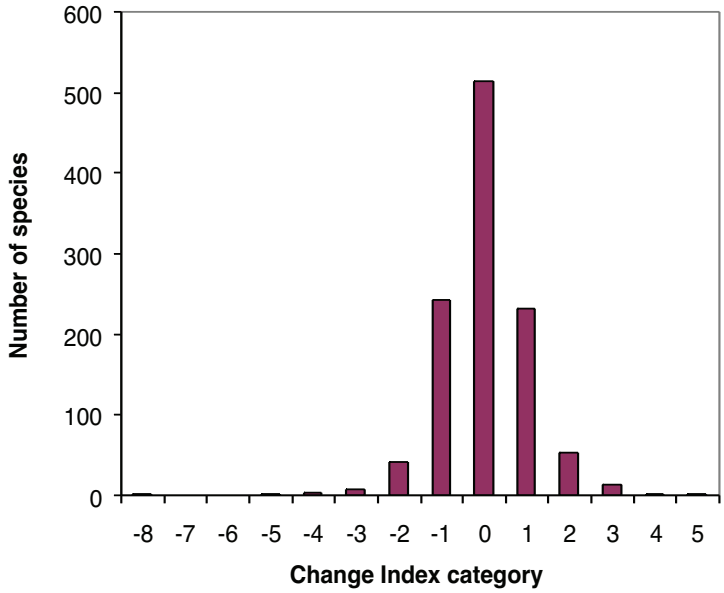
- The magnitude of change in occurrence of vascular plants across Scotland as a whole was almost identical for all three regions (Figure 1).
- Almost half of the species for which a change index could be calculated (515) changed in range size very little, and equal numbers of species either decreased (298) or increased (300) (Figure 2).
- Native plants showed a similar pattern in range size (Figure 2b), but non-native plants experienced greater change, with almost equal numbers having decreased, increased or changed little (Figure 2c).
- As identified by Preston *et al.,* (2002a & b), change among non-native species in the UK as a whole showed contrasting trends, with archaeophytes, long-established plants present before AD 1500, decreasing and neophytes, those species that arrived after AD 1500, increasing. Since not all non-native species have been classified as archaeophytes or neophytes for Scotland specifically, this distinction has only been evaluated qualitatively for individual habitats.
- Trends in occurrence of plants varied widely between habitats (Figure 3).
- Arable weeds showed the most dramatic decline whereas freshwater plants strongly increased. The latter trend may be spurious as recording effort for freshwater species was substantially greater in the later recording period.
- In the other habitats change was modest with grassland and upland species showing the largest decline.

[1] The seven broad habitats are Uplands, Grasslands, Woodlands, Freshwater, Coastal, Built-up areas and gardens, Linear and boundary features. Native and Non-native species of Freshwater were treated separately, and the performances of Arable weeds and of species characteristic of base-poor substrates were examined.

- Species confined to soils on base-poor substrates have apparently increased in the Highlands, but this is thought merely to reflect poor recording in the past. They have declined somewhat in the east and south, mainly as a result of the overgrowth or destruction of heathland.
- In general native species showed a slight decline across all habitats except Built-up areas and gardens, Woodlands and Freshwater (Figure 3b).
- Trends for non-native species showed a different pattern (Figure 3c). The proportion of non-native species varied considerably from habitat to habitat, from 2% in upland habitats to 85% in built up areas and gardens. Overall, 29% of species for which change indices were calculated were non-native.
- Non-native species showed a noticeable increase in occurrence in the Upland, Woodland and Freshwater broad habitats. (However, the Upland result is based on only three species). Smaller increases were observed for Coastal habitats and Built-up areas and gardens. Species of Linear features showed little or no change, whereas non-native Arable weeds and Grassland species decreased, though the number of non-native species in Grassland (10) is also small.

**Figure 1 Number of species in each change index category for a) Scotland as a whole, or b) the three regions of Scotland defined by Preston *et al.*, 2003**

a)



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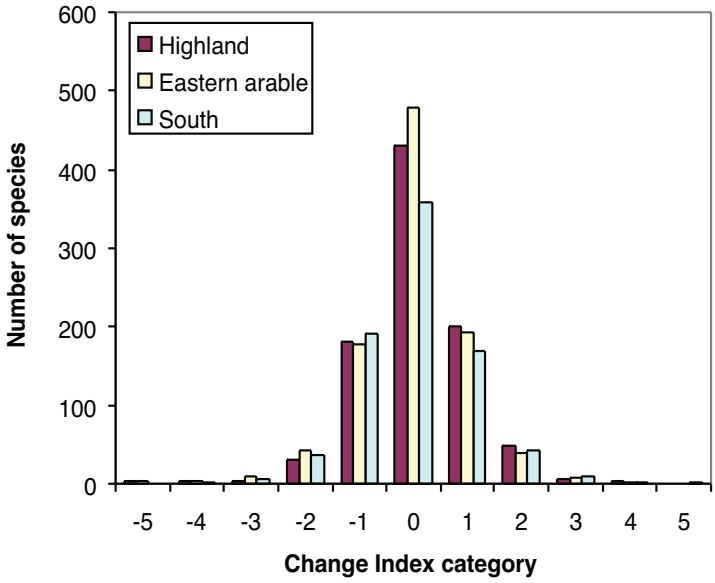



**Figure 2** **Proportion of species showing an increase, decrease or little change (change index score of –0.5 to 0.5) for either a) all species, b) species that are native to Scotland or c) species that are not native to Scotland**

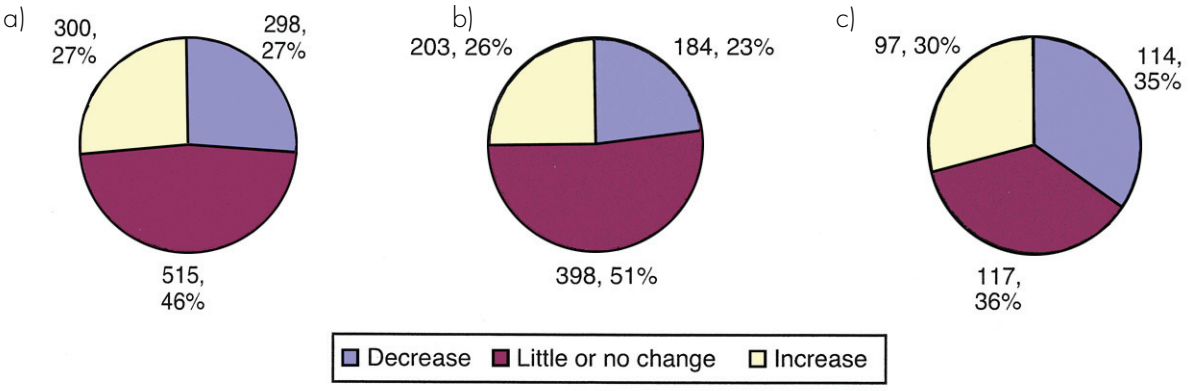
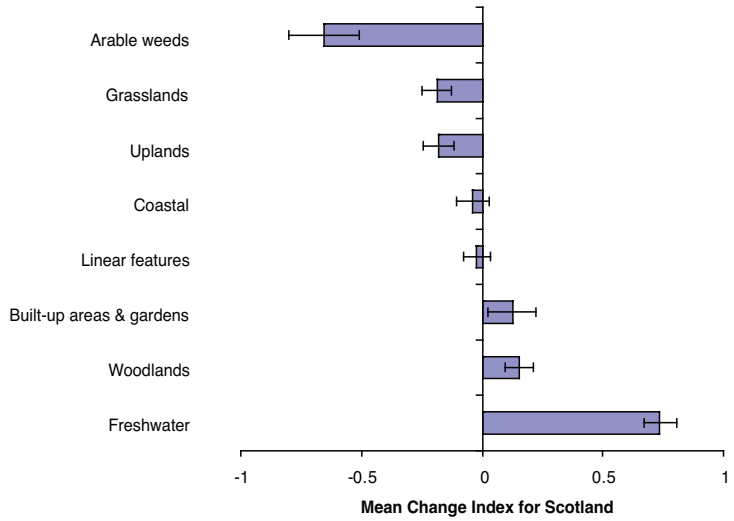



**Figure 3** **Mean change index per broad habitats for a) all species, b) native species and c) non-native species to Britain. The error bars show standard errors**

a)



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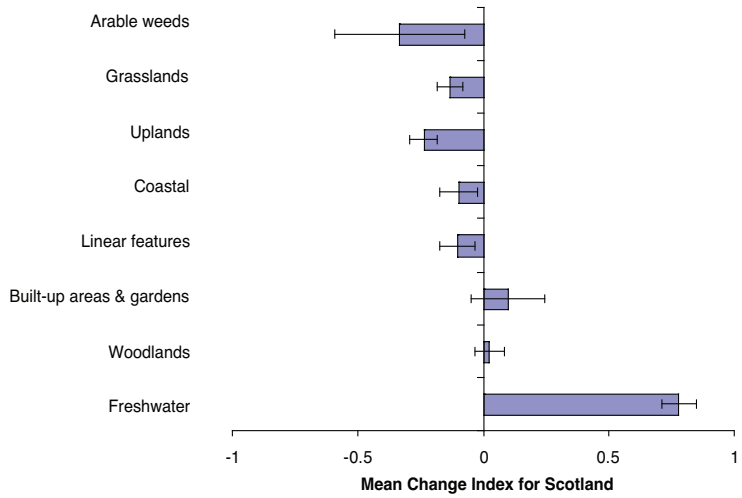
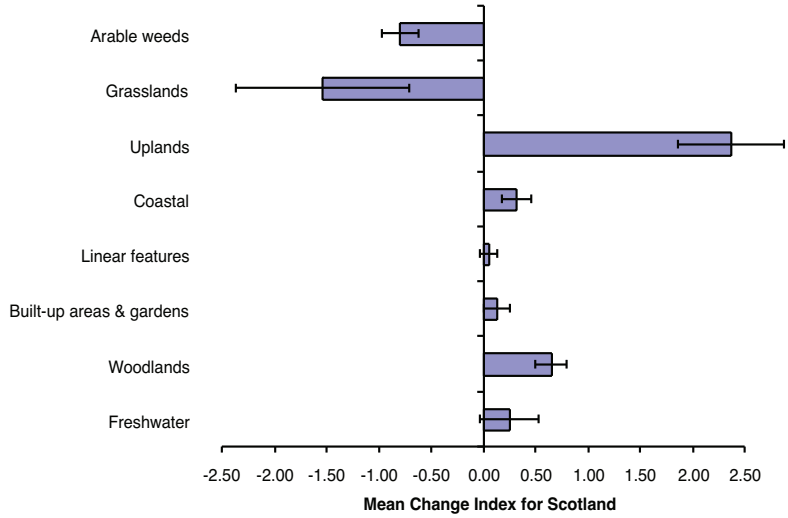



c)




## Authorship

R. van der Wal – Centre for Ecology and Hydrology

# 3 UPLANDS

Uplands cover more than 50% of Scotland's land area, and include moorland, peatland and montane habitats (McGowan *et al.*, 2002). Tree cover is naturally suppressed where conditions are either too wet, cold or exposed, but sheep and deer grazing, as well as heather burning for grouse, have also restricted woodland regeneration. Frequent burning or heavy grazing has often been implicated in damage to the semi-natural vegetation, as has extensive draining.

The habitat type depends upon the underlying rock (basic or acidic), the prevailing climate, drainage and exposure, as well as land management activities. Although typically nutrient-poor, Scottish upland areas also support significant hotspots for species richness. Trends in species of the following upland habitats are reported on here.

- Heath – includes dry heaths on mainly mineral-based soils, and wet heaths on acid, peat-based soils. Heaths can include complex community mosaics, sometimes with basic rock outcrops or flushes where dwarf-shrub heath species are replaced by more base-tolerant broad-leaved herbs.
- Bog – these are the most extensive of all the broad habitats in Scotland. Bogs are found on deep, wet acid peat, with little or no mineral input other than rain. Bog-mosses can be a major component of the vegetation, which can include many scarce or rare species where not modified by over-grazing or draining. Both raised and blanket bogs are included in this category.
- Montane – wind-clipped or moss-heath communities are found above the natural tree-line. They are often accompanied by a diverse range of lichen, moss and liverwort species rare in other habitats. Sub-arctic tundra is at the southernmost limit of its range in Scotland.

The inclusion of Heath in this profile results in the presence in the 'Upland' category of some species which are restricted to low altitudes. The Upland category comprises species characteristic of a group of habitats associated with unenclosed land (often upland) rather than a selection of species defined with reference to their altitudinal limits.

## 3.1 Trends

Change has been assessed for 138 species considered to be characteristic of Upland habitats. Almost all of these are undoubtedly native. One species, Purple colt's-foot *Homogyne alpina* is doubtfully native. There are just five non-native species, which are not represented in a separate pie chart, because of their small number. Of these, 80% are strongly increasing (Table 1).

- Many upland species show no apparent or only limited change (Figure 1a). Specifically, 77 (56%) of the species assessed remain unchanged, whilst 18 (13%) are increasing and 43 (31)% decreasing their ranges (Figure 2).
- Upland species maintained their frequency in the Highlands, but in the Eastern Arable and South regions showed a marked decline (Figure 1b).
- Three of the five species showing the most extreme decreases occur in heathland, especially in dry heaths in the east. Heath cudweed *Gnaphalium sylvaticum* and Annual Knawel *Scleranthus annuus* have declined also in southern Britain. Dodder *Cuscuta epithymum* has also declined markedly in most of

Britain; its foothold in Scotland was always precarious and there are no post–1987 records (Preston *et al.,* 2002a). Lesser butterfly-orchid *Platanthera bifolia* is a plant of pastures as well as moorland, and has declined especially in the south. Eyebrights *Euphrasia officinalis* agg. are taxonomically difficult, and examination of the map (Preston *et al.,* 2002a) leads us to think that the apparent decline in Scotland is, in part, an artefact of recording. Both *Platanthera bifolia* and *Euphrasia officinalis* agg. have been lost from some sites as a result of the agricultural intensification, but the loss of lowland populations is likely to have been greater than that of those in the uplands (D. Horsfield, *pers. comm.*).

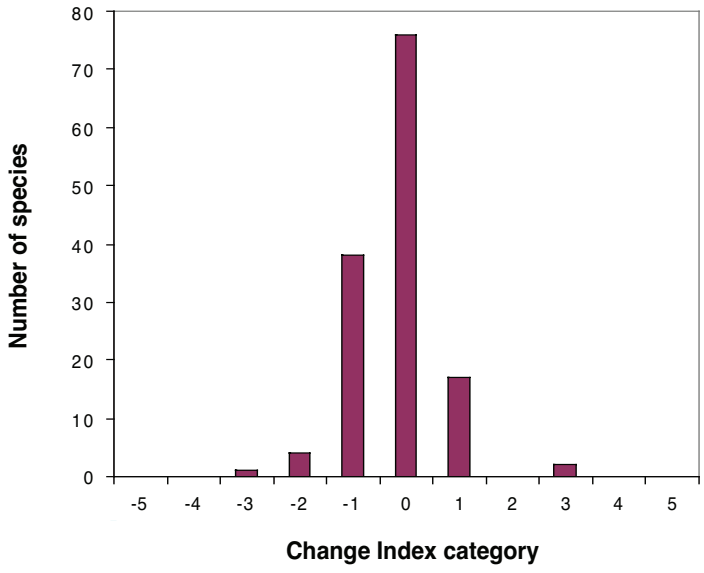
- The three species that showed the greatest increase, New Zealand willowherb *Epilobium brunnescens*, Himalayan cotoneaster *Cotoneaster simonsii* and rhododendron *Rhododendron ponticum* are the only three definitely non-native species in the group, and are notable for their ability to invade native habitats. The two remaining species that show the greatest increase were probably under-recorded in previous surveys (Preston *et al.,* 2002a); this is obviously the case for small cranberry *Vaccinium microcarpum* which is extremely similar to the commoner cranberry *V. oxycoccos*. Green-ribbed sedge *Carex binervis* is generally common and has apparently increased in the south, but previous poor recording seems more likely than a real increase.

- In general, the change in upland species reflects the changes found in upland habitats in Scotland as a whole (McGowan *et al.,* 2002). There are very few extreme changes, but the general trends points toward declines in less-competitive species associated with nutrient-poor sites, and a slight increase in more generalist or grazing-tolerant species. These trends are similar to the overall trends for Scottish plant species described by Preston *et al.,* (2003).

Drivers of change in upland habitats include variation in grazing pressure and burning regimes, the agricultural intensification of marginal upland areas resulting in the reduction in heather moorland, increased atmospheric nitrogen deposition, and the general fragmentation of upland habitats (McGowan *et al.,* 2002). The two woody non-native species are invasive and likely themselves to become drivers of change in the future. The decline of upland species in the east and south reflects loss of heathland and bog in these areas in the second half of the 20th century.

**Figure 1 Number of upland species in each change index category for a) Scotland as a whole, or b) the three regions of Scotland defined by Preston *et al.*, 2003**

a)



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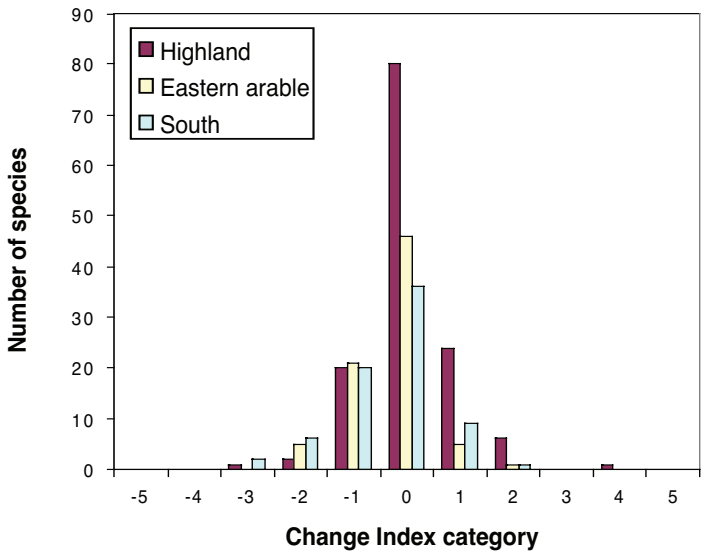



**Figure 2 Proportion of upland species showing an increase, decrease or little change (change index score of −0.5—0.5)**

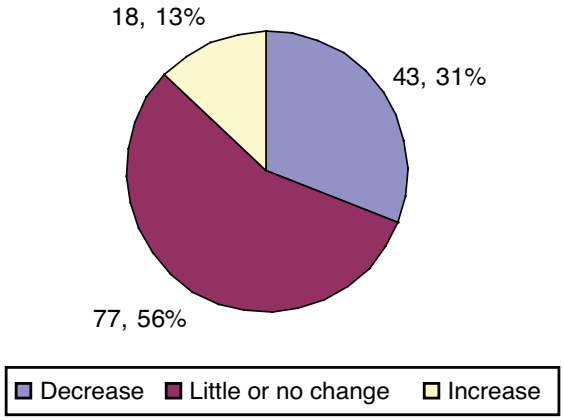


**Table 1 The 10 Scottish upland species showing the largest increases (five species) or decreases (five species) for Scotland as a whole. The figures show the change index scores for the species for Scotland and the three Scottish regions defined by Preston *et al.*, 2003**

| | | Change index score | | | |
|---|---|---|---|---|---|
| **Scientific name** | **Common name** | **Scotland** | **Highlands** | **Eastern Arable** | **South** |
| *Gnaphalium sylvaticum* | Heath cudweed | –2.74 | –2.11 | –2.22 | –2.85 |
| *Scleranthus annuus* | Annual knawel | –2.28 | –2.65 | –1.39 | –2.56 |
| *Cuscuta epithymum* | Dodder | –1.87 | | | |
| *Platanthera bifolia* | Lesser butterfly-orchid | –1.75 | –1.64 | 0.01 | –1.78 |
| *Euphrasia officinalis aggregate* | Eyebrights | –1.74 | –1.49 | –1.12 | –2.13 |
| *Vaccinium microcarpum* | Small cranberry | 1.07 | 1.32 | | |
| *Carex binervis* | Green-ribbed sedge | 1.34 | 0.79 | 0.97 | 1.14 |
| *Rhododendron ponticum* | Rhododendron | 1.37 | 1.2 | 1.42 | 0.97 |
| *Cotoneaster simonsii* | Himalayan cotoneaster | 2.79 | 2.4 | 2.25 | 2.47 |
| *Epilobium brunnescens* | New Zealand willowherb | 2.96 | 3.99 | 0.24 | 1 |

Authorship

I. Pearce – Centre for Ecology and Hydrology

# 4 GRASSLANDS

Grasslands are open habitats dominated by grass species, but can also contain a wide diversity of broad-leaved herbs. Grassland is only present where the growth of taller herbs and woody species is prevented, for example by grazing by rabbits, deer or domestic stock, or by mowing for hay or silage. These pressures avert the gradual succession of grassland to woodland.

Depending upon the intensity and frequency of the disturbance, the underlying rock type and the prevailing climate, a range of different grassland types can develop. There are four main types of grassland in Scotland, varying in the richness of both grasses and herbs (McGowan *et al.,* 2002):

- Acid grasslands – relatively species poor communities growing on a range of substrates from dry sandy soils in the lowlands to acid, peat-based upland soils;
- Neutral grasslands – comparatively species-rich systems, commonly found in lowland areas and managed as pastures or hay meadows, growing on a neutral substrate without substantial nutrient enrichment;
- Calcareous grassland – nearly totally restricted to limestone in Scotland, with high species richness and the occurrence of rare calcicoles, which require soils of low fertility;
- Improved grassland – grassland to which nutrients are added either as chemical fertilisers or dung to increase productivity. They are often comparatively species-poor because of the dominance of a few competitive species.

## 4.1 Trends

Change has been assessed for 253 species considered characteristic of grasslands. These comprise 221 native or doubtfully native and only 32 non-native species.

- Across Scotland, 109 of the grassland species assessed (43%) showed no apparent or only limited change whilst 54 (21%) increased and 90 (36%) decreased in terms of their ranges (Figures 1a and 2a). This pattern of change of grassland species was broadly similar in the three Scottish regions, but with the tendency to decrease more marked in the Highland region (Figure 1b).
- Non-native grassland species are so few that the apparently greater decline of non-native species is not significantly different from the overall pattern in Scotland (Figures 2b and 2c).
- Although in Britain as a whole, non-native grassland species are generally expanding, one of the non-native species is decreasing in Scotland (caraway *Carum carvi*) and two show little or no change (Pale toadflax *Linaria repens*, Masterwort *Peucedanum ostruthium*).
- The two most strongly decreasing grassland species, Slender soft-brome *Bromus lepidus* and Italian ryegrass *Lolium multiflorum*, were both dependent on a regime of frequent re-seeding. *B. lepidus* apparently suffered an extreme decline (128 10km square records pre-1970 and just 5 post-1970), although it is uncertain whether this is a real phenomenon or whether it reflects uncertainty about the identification of this species and its close relatives (Preston *et al.*, 2002a). The decrease in Caraway *Carum carvi* is consistent with the general decrease in old-established introductions throughout Scotland (Preston *et al.,* 2003), possibly as a result of changed farming practices and the abandonment of

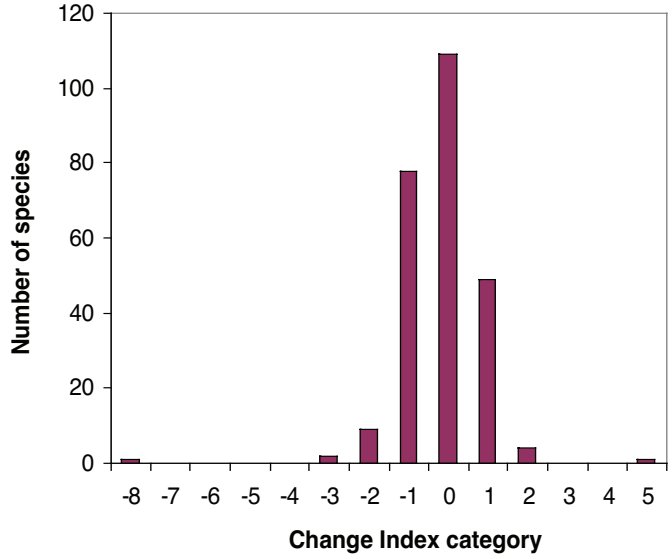
caraway as a cultivated species (Preston *et al.,* 2002a). The other two most strongly declining species, Field madder *Sherardia arvensis* and Annual knawel *Scleranthus annuus*, are characteristic of low-fertility habitats and have probably declined as a result of agricultural intensification.

- Creeping bent *Agrostis stolonifera* has apparently increased strongly in the Highlands and South (Table 1). The cause of this is debatable. *A. stolonifera* may have been under-recorded in the 1950s, but it may equally have responded to modern road-building, especially of forest roads in remote areas. The less-strongly increasing Sand spurrey *Spergularia rubra* may also have responded to this change.
- The other three grassland species showing the greatest increases, Common dog-violet *Viola riviniana*, Red fescue *Festuca rubra* and Soft-rush *Juncus effusus*, are almost ubiquitous and were probably equally common in the past; the apparent changes (not large) are probably due to earlier under-recording.

In general, the change in grassland species reflects the changes found in grassland habitats in Scotland as a whole (McGowan *et al.,* 2002). There are few extreme changes, but the general trend points toward declines in specialist species associated with nutrient-poor sites and drier soils, and an increase in generalist species or those associated with wetter sites. These trends are similar to the overall trends for Scottish plant species described by Preston *et al.,* (2003).

**Figure 1 Number of grassland species in each change index category for either a) Scotland as a whole, or b) the three regions of Scotland defined by Preston *et al.,* 2003**

a)



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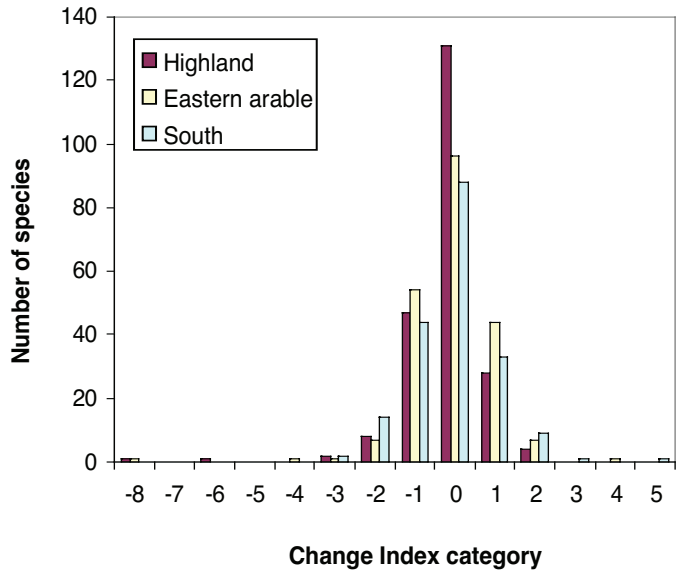



**Figure 2** **Proportion of grassland species showing an increase, decrease or little change (change index score of −0.5 to 0.5) for either a) all species, b) species that are native to Scotland or, c) species that are not native to Scotland**

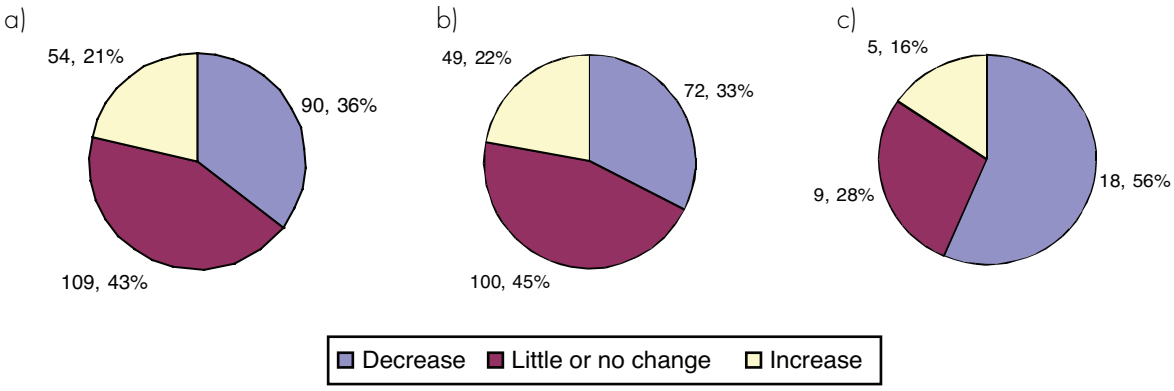


**Table 1 The 10 Scottish grassland species showing the largest increases (five species) or decreases (five species) for Scotland as a whole. The figures show the change index scores for the species for Scotland and the three Scottish regions defined by Preston *et al.*, 2003**

| | | Change index score | | | |
|---|---|---|---|---|---|
| **Scientific name** | **Common name** | **Scotland** | **Highlands** | **Eastern Arable** | **South** |
| *Bromus lepidus* | Slender soft-brome | –8.06 | –8.03 | –7.73 | –2.55 |
| *Lolium multiflorum* | Italian rye-grass | –3.23 | –3.6 | –3.23 | –1.73 |
| *Carum carvi* | Caraway | –2.85 | –1.25 | –5.68 | |
| *Sherardia arvensis* | Field madder | –2.36 | –1.1 | –2.82 | –2.31 |
| *Scleranthus annuus* | Annual knawel | –2.28 | –2.65 | –1.39 | –2.56 |
| *Spergularia rubra* | Sand spurrey | 1.58 | 1.57 | 1.11 | 1.25 |
| *Viola riviniana* | Common dog-violet | 1.71 | 1.82 | 0.36 | 1.25 |
| *Festuca rubra aggregate* | Red fescue aggregate | 1.74 | 0.81 | 1.36 | 3.23 |
| *Juncus effusus* | Soft-rush | 1.81 | 2.04 | 0.57 | 0.43 |
| *Agrostis stolonifera* | Creeping bent | 4.56 | 4.25 | 1.96 | 4.67 |

Authorship

R. Brooker – Centre for Ecology and Hydrology

# 5 WOODLANDS

Although all woodlands are habitats dominated by trees, the extent of the tree cover varies between woodland types. For example native Caledonian pine woods often have a low cover of trees and an almost complete cover of ground flora, while planted conifer woods may have a high density of trees with little, if any, ground flora cover. Some Scottish woodlands are ancient, such as Caledonian pinewoods and Atlantic oakwoods, while others are more recent such as commercial forestry plantations. Ancient woodlands have been present for many centuries and tend to have a much richer flora than recent plantations. In the 1980s, there was large-scale planting of conifers over much of Scotland, but this has declined in response to changes in government subsidies and a shift in policy towards increasing the extent of native woodlands.

Woodlands can be classified into two broad groups, coniferous and broadleaved. Within these two groups are native and non-native woodlands. There are five Biodiversity Action Plan priority woodland habitats in Scotland: native pinewoods, upland mixed ashwoods, upland oakwoods, wet woodland, wood pasture and parkland.

## 5.1 Trends

Change has been assessed for 217 species considered to be characteristic of woodland habitats, of which 144 are native and 73 non-native to Scotland.

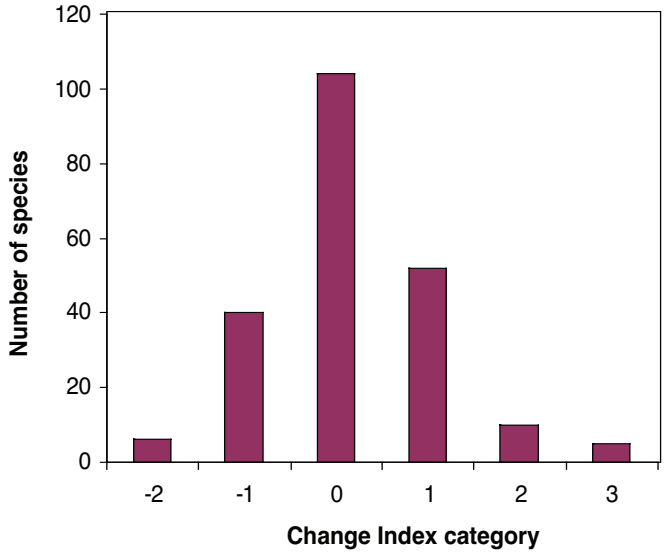
- Many of the woodland species assessed showed little change (48%), while 31% of species increased and 21% decreased (Figures 1a & 2a). This pattern of change of woodland species is broadly similar in the three Scottish regions (Figure 1b) but the tendency for woodland species to increase is most marked in the Eastern Arable area and the tendency to decrease is most marked in the south.
- When the woodland species are classified as either native or non-native two very different patterns of change are seen. Of the native woodland species half (53%) have remained unchanged, with 22% increasing and 25% decreasing (Figure 2b).
- Of the non-native woodland species, 49% have increased, 37% have remained unchanged and only 14% have decreased (Figure 2c).
- Two of the five most strongly decreasing species, Dusky crane's-bill *Geranium phaeum* and Perfoliate honeysuckle *Lonicera caprifolium* are non-natives that have long been cultivated in gardens. *L. caprifolium* is now rarely grown and has declined accordingly. The decline of *G. phaeum*, still popular with gardeners, is harder to explain, but it has clearly not naturalised widely in Scotland.
- Early dog-violet *Viola reichenbachiana* is native only in two 10km squares in the southwest. Its apparent decline is due to the loss of non-persistent introduced populations further north. The two butterfly-orchids *Platanthera chlorantha* and *P. bifolia* have declined generally in Britain. It is not clear from national-scale data whether the main loss in Scotland was in woodland or (more likely) non-woodland habitats.
- The five most strongly increasing species are all non-natives, which have either been deliberately planted by gardeners, foresters and game managers or thrown out by gardeners. Dotted loosestrife *Lysimachia punctata*, Montbretia *Crocosmia* x *crocosmiiflora* and Yellow archangel (in Scotland mainly the variegated ornamental ssp. *argentatum*) are mainly or wholly clonal plants that spread where they are

planted or discarded into the wild. The two woody species European larch *Larix decidua* and Cherry laurel *Prunus laurocerasus* are widely planted, and *L. decidua* regenerates freely from seed.

Although the Planted conifer *Larix decidua* has a large positive change index (2.55), most other non-native species with change indices greater than 1 are not species planted in, or inhabiting, commercial forestry (Few-flowered garlic *Allium paradoxum*, Pink purslane *Claytonia sibirica*, Japanese knotweed *Fallopia japonica*, Snowdrop *Galanthus nivalis*, Oregon grape *Mahonia aquifolium*, Grey poplar *Populus alba x tremula*, Turkey oak *Quercus cerris*, Blackcurrant *Ribes nigrum*, Red-berried elder *Sambucus racemosa* and Snowberry *Symphoricarpos albus*). Thus the increase in non-native woodland species is not explained by the increase in commercial forestry plantations. Most of the species listed are garden escapes, whereas *Populus alba x tremula* and *Quercus cerris* are planted trees which are now recorded more assiduously than they were in the past.

**Figure 1 Number of woodland species in each change index category for either a) Scotland as a whole, or b) the three regions of Scotland defined by Preston *et al.*, 2003**

a)




b)

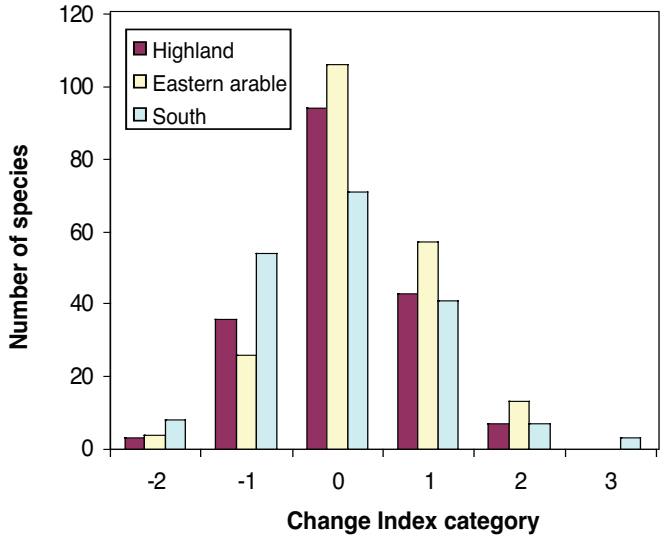


**Figure 2** **Proportion of woodland species showing an increase, decrease or little change (change index score of –0.5 to 0.5) for either a) all species, b) species that are native to Scotland or, c) species that are not native to Scotland**

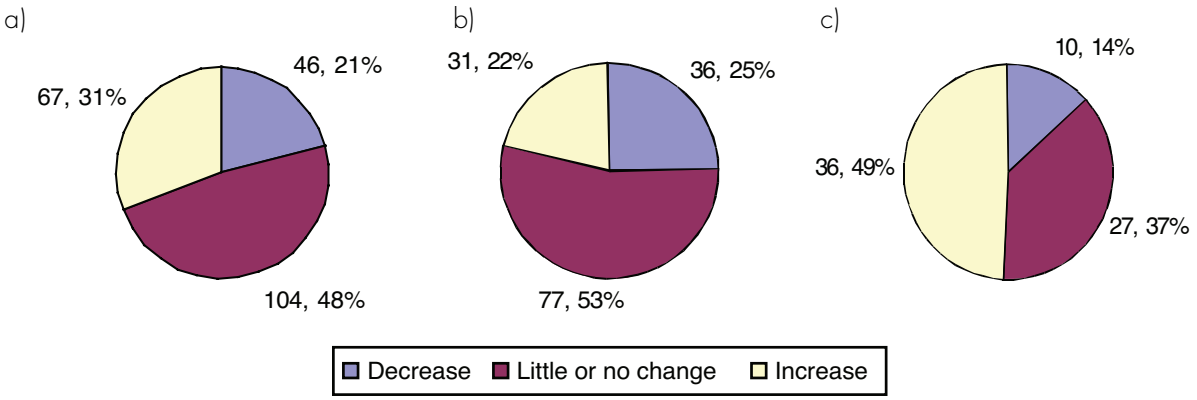



**Table 1** **The 10 Scottish woodland species showing the largest increases (five species) or decreases (five species) for Scotland as a whole. The figures show the change index scores for the species for Scotland and the three Scottish regions defined by Preston *et al.*, 2003**

| | | Change index score | | | |
|---|---|---|---|---|---|
| **Scientific name** | **Common name** | **Scotland** | **Highlands** | **Eastern Arable** | **South** |
| *Geranium phaeum* | Dusky crane's-bill | –1.81 | –1.28 | –2.25 | –1 |
| *Viola reichenbachiana* | Early dog-violet | –1.77 | –1.1 | –1.77 | –1.19 |
| *Platanthera bifolia* | Lesser butterfly-orchid | –1.75 | –1.64 | 0.01 | –1.78 |
| *Lonicera caprifolium* | Perfoliate honeysuckle | –1.63 | | –0.94 | |
| *Platanthera chlorantha* | Greater butterfly-orchid | –1.63 | –2.09 | –0.29 | –0.05 |
| | | | | | |
| *Larix decidua* | European larch | 2.55 | 2.39 | 3.19 | 0.73 |
| *Prunus laurocerasus* | Cherry laurel | 2.6 | 1.7 | 2.19 | 2.57 |
| *Lamiastrum galeobdolon* | Yellow archangel | 2.63 | | 2.03 | 2.31 |
| *Crocosmia aurea x pottsii (C. x crocosmiiflora)* | Montbretia | 2.86 | 2.35 | 2.4 | 2.61 |
| *Lysimachia punctata* | Dotted loosestrife | 3.07 | 2.47 | 1.88 | |

## Authorship

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# 6 NATIVE FRESHWATER SPECIES

It is impossible to provide a precise or definitive list of freshwater plants (Preston & Croft 1997). Even some plants found in aquatic environments may become seasonally terrestrial as water levels fluctuate. There are plants that characterise water margins and wetland areas that are also found elsewhere in predominantly terrestrial locations. The freshwater species reported on here include those that are aquatic as well as those that are found along margins of water bodies and associated wetlands. However, brackish, peatland, upland flush and damp habitat species have been excluded. This is in keeping with other published lists of freshwater species. *The fresh waters of Scotland have been described as 'a national resource of international significance (Maitland, Boon & McLusky 1994). Three categories have been considered, standing waters, and canals; rivers and streams; and wetland (fen, marsh and swamp). Lochs, the most important standing waters for vascular plants, are most numerous in the western Highlands. By contrast, the major rivers are found in the less rugged eastern and southern parts of Scotland. There are two botanically important canals, the Forth & Clyde Canal and the Union Canal, in the central belt. Both lochs and rivers can be fringed by marsh and swamp communities.*

Waters may be ***calcareous*** (with relatively high concentrations of dissolved calcium) or ***base-poor*** (with low concentrations of calcium or other basic salts). They can be divided into three major categories on the basis of their nutrient status: ***eutrophic*** waters have high levels of nutrients such as nitrogen and phosphorus, ***oligotrophic*** waters have low levels and ***mesotrophic*** waters are intermediate. There is a correlation between base-status and nutrient status: base-rich waters are usually mesotrophic or eutrophic and base-poor sites are usually oligotrophic. However, some base-rich lochs may have low nutrient levels and these often have very rich floras.

## 6.1 Trends

In recent years much greater attention has been paid to aquatic plants than in the earlier survey for the *Atlas of the British Flora* (Perring & Walters 1962). This creates difficulties in establishing trends in the frequency of native species. Change has been assessed for 155 species considered characteristic of freshwater habitats.

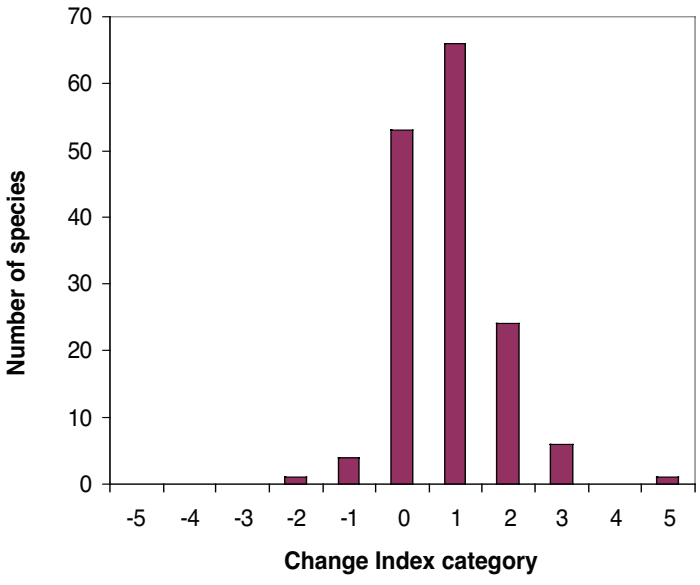
- Far more of the native aquatic plants assessed appear to have increased (94, 62%) or to show little or no change (52, 34%) than have shown a substantial decrease (5, 3%) in the period since 1930 (Figure 2). However, this in part probably reflects the increased recording effort which has been devoted to them in recent years. Changes in the ranges of the remaining 55 species cannot be quantified.
- The apparent increase in native freshwater species is greatest in the Highland region (Figure 1b), the region where water bodies have been least modified by change and where aquatic plants had previously been most seriously under-recorded.
- None of the five species which have shown a substantial decrease are true aquatics adapted to life in permanent water. The five species showing the greatest decline (Table 1) are Tubular water-dropwort *Oenanthe fistulosa* and Tufted-sedge *Carex elata*, which are species of marginal habitats, predominantly southern in Britain and very rare in Scotland. Hairy stonecrop *Sedum villosum*, and Variegated horsetail *Equisetum variegatum* are plants of upland flushes which have most of its British populations in Scotland. Water forget-me-not *Myosotis scorpioides*, is a frequent species which appears to have declined in NW Scotland for reasons which are unclear.

- The species showing the greatest increase is creeping bent *Agrostis stolonifera*, which, in addition to growing in aquatic habitats, also grow in a wide range of terrestrial habitats. Of the remaining four species that have showed the greatest increase, three are true aquatics which are very widespread in Scotland (floating bur-weed *Sparganium angustifolium*, small pondweed *Potamogeton berchtoldii* and alternate water-milfoil *Myriophyllum alterniflorum*); their apparent increase represents the combination of large populations in the many lochs of northern and western Scotland that were little affected by change in the 20th century, coupled with increasingly efficient survey. The fifth species, intermediate water-starwort *Callitriche hamulata* sens. lat., may grow as an aquatic or on damp mud by the water side; it was also under-recorded in the earlier survey (Preston *et al.*, 2002a).

As water depth and water chemistry play a crucial role in determining the aquatic flora, the most important drivers of change tend to be processes which influence these factors. These include the development of waters for hydro-electric power or their use as reservoirs, which both have great effects on the water levels. Very severe fluctuations in water levels can create a very hostile environment for aquatic plants. Eutrophication, the increase in the level of nutrients, can be brought about by the input into the water of the products of domestic sewage, industrial processes or agricultural fertilisers. This has been an important driver of change, especially in well-populated, lowland areas, since the mid 19th century. Afforestation of a catchment may result in changes to the water regime (with increases of suspended solids as erosion is greater after planting or felling), increased eutrophication (as forest fertilisers are washed into the water) and/or acidification (as the trees in the catchment trap more $SO_2$, $NO_x$, sulphate and nitrate ions) and the loss of open, flush habitats. Mass afforestation was carried out in Scotland in the second half of the 20th century. River engineering can have a major impact on water quality and flow, and thus on aquatic plants. Other factors which may have an impact locally include the impact of livestock on marginal vegetation: grazing of marginal vegetation tends to reduce tall stands of emergents and increase the opportunity for small, often annual species to colonise the water's edge.

**Figure 1 Number of native freshwater species in each change index category for either a) Scotland as a whole, or b) the three regions of Scotland defined by Preston *et al.*, 2003**

a)



b)

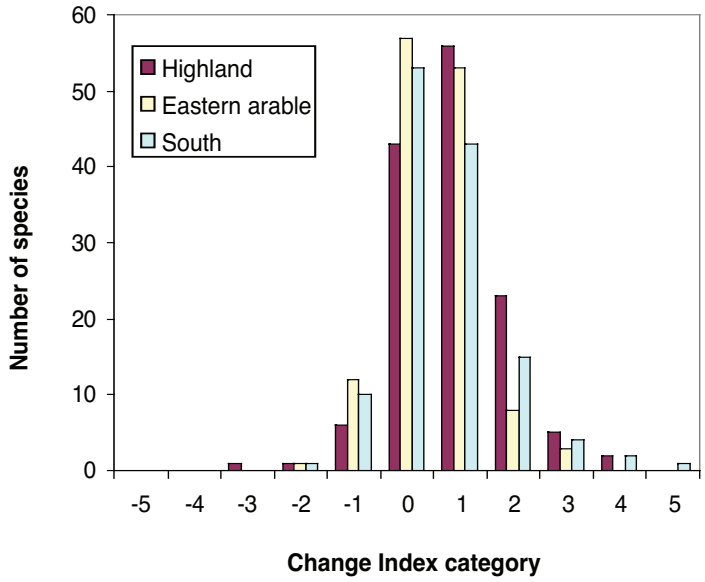



**Figure 2 Proportion of freshwater species native to Scotland showing an increase, decrease or little change (change index score of −0.5—0.5)**

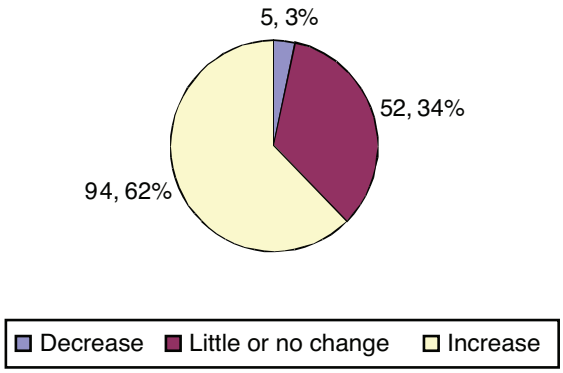


**Table 1 The 10 Scottish native freshwater species showing the largest increases (five species) or decreases (five species) for Scotland as a whole. The figures show the change index scores for the species for Scotland and the three Scottish regions defined by Preston *et al.*, 2003**

| | | Change index score | | | |
|---|---|---|---|---|---|
| **Scientific name** | **Common name** | **Scotland** | **Highlands** | **Eastern Arable** | **South** |
| *Oenanthe fistulosa* | Tubular water-dropwort | –1.68 | –2.30 | | –2.11 |
| *Sedum villosum* | Hairy stonecrop | –0.98 | –0.78 | –0.29 | –1.44 |
| *Myosotis scorpioides* | Water forget-me-not | –0.71 | –0.85 | 0.05 | –0.52 |
| *Carex elata* | Tufted-sedge | –0.59 | | –1.77 | |
| *Equisetum variegatum* | Variegated horsetail | –0.54 | –0.18 | –0.81 | |
| *Myriophyllum alterniflorum* | Alternate water-milfoil | 2.66 | 2.90 | 1.73 | 1.84 |
| *Potamogeton berchtoldii* | Small pondweed | 2.97 | 3.16 | 1.06 | 2.60 |
| *Sparganium angustifolium* | Floating bur-reed | 2.98 | 3.64 | 1.18 | 2.47 |
| *Callitriche hamulata* sens. alt. | Intermediate water-starwort | 3.19 | 2.2 | 3.08 | 3.49 |
| *Agrostis stolonifera* | Creeping bent | 4.56 | 4.25 | 1.96 | 4.67 |

Authorship

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# 7 NON-NATIVE FRESHWATER SPECIES

It is impossible to provide a precise or definitive list of freshwater plants (Preston and Croft 1997). Even some plants found in aquatic environments may become seasonally terrestrial as water levels fluctuate. There are plants that characterise water margins and wetland areas that are also found elsewhere in predominantly terrestrial locations. The freshwater species reported on here include those that are aquatic as well as those that are found along margins of water bodies and associated wetlands. However, brackish, peatland, upland flush and damp habitat species have been excluded. This is in keeping with other published lists of freshwater species. The list includes 80 non-native species. However, many of these are extremely rare. Uncommon introductions were not systematically recorded for the *Atlas of the British Flora* (1962), so it is impossible to compare their distribution in that survey with that established for the *New Atlas* (Preston *et al.,* 2002a).

## 7.1 Trends

Only 13 species have been recorded with sufficient frequency and consistency in both surveys to allow the change in their distribution between surveys to be calculated.

- Five non-native species were recorded in both the 1930–69 and 1987–99 period and showed a substantial increase in the latter period (Table 1). These are Canadian waterweed *Elodea canadensis*, Indian balsam *Impatiens glandulifera*, Giant hogweed *Heracleum mantegazzianum*, Sweet-flag *Acorus calamus* and Flowering-rush *Butomus umbellatus*. The first three species are 19th century introductions. *E. canadensis* was probably introduced accidentally to Scotland with ornamental water plants in 1842 (Preston 2002); *I. glandulifera* and *H. mantegazzianum* were deliberately introduced as garden plants. *A. calamus* is an earlier but much more slowly spreading introduction. *B. umbellatus* is native to England but has spread northwards, probably from planted stock (Preston and Croft 1997).

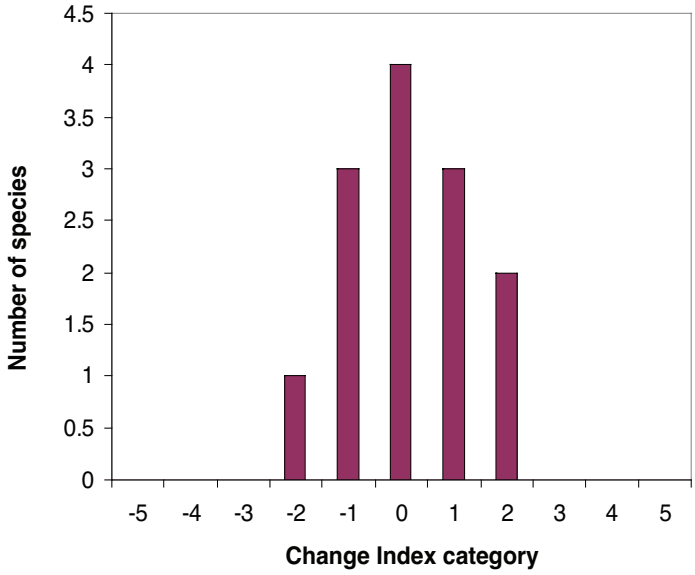
- A number of species which were first recorded in the wild in Britain in the mid 20th century, and not recorded in the 1930–69 survey or with too few records to be included in the statistical comparison with the 1987–99 results, are now well established in Scotland. The only widespread species is garden lady's-mantle *Alchemilla mollis*; others which are still relatively rare in Scotland include Water fern *Azolla filiculoides*, Greater cuckooflower *Cardamine raphanifolia,* New Zealand pigmyweed *Crassula helmsii,* Nuttall's Waterweed *Elodea nuttallii,* Curly waterweed *Lagarosiphon major* and Parrot's-feather *Myriophyllum aquaticum*.

- Four non-native species showed a clear decline in occurrence. Among those is the perennial herb Nootka Lupin *Lupinus nootkatensis*, occurring in Scotland only on river shingles and streamsides. The species was first recorded in the wild by the River Dee in 1862, having escaped from Balmoral Castle. It is now rarely cultivated, having been replaced by Russell Lupin *L. x regalis*. Whereas the hybrid appears to have increased, *L nootkatensis* is in decline. Round-leaved mint *Mentha suaveolens* is native in SW England and Wales but introduced elsewhere and declining throughout its non-native range (Preston *et al.*, 2002a). Swamp meadow-grass *Poa palustris* has declined is Scotland as in the rest of Britain, for reasons that are quite unclear. The apparent slight decline of Monkeyflower *Mimulus* agg. is surprising and perhaps results from a neglect of group of species which were formerly simply recorded as '*Mimulus guttatus*' but are now recognised as a complex of species and hybrids.

- Some species often thought to be troublesome invaders of native ecosystems, in England including floating pennywort *Hydrocotyle ranunculoides*, were not recorded in Scotland in the 1987–99 period.
- There are too few non-native species to identify regional trends within Scotland (Figure 1b).

**Figure 1 Number of non-native freshwater species in each change index category for either a) Scotland as a whole, or b) the three regions of Scotland defined by Preston *et al.*, 2003**

a)




b)

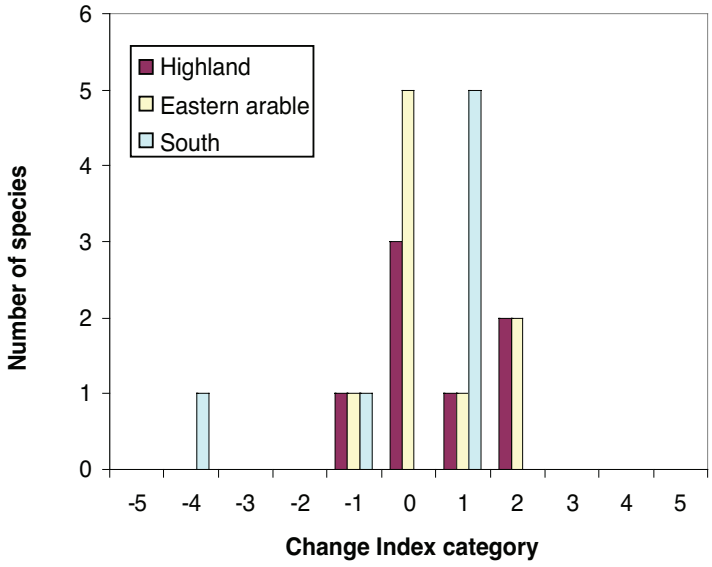


**Figure 2** **Proportion of freshwater species non-native to Scotland showing an increase, decrease or little change (change index score of −0.5—0.5)**

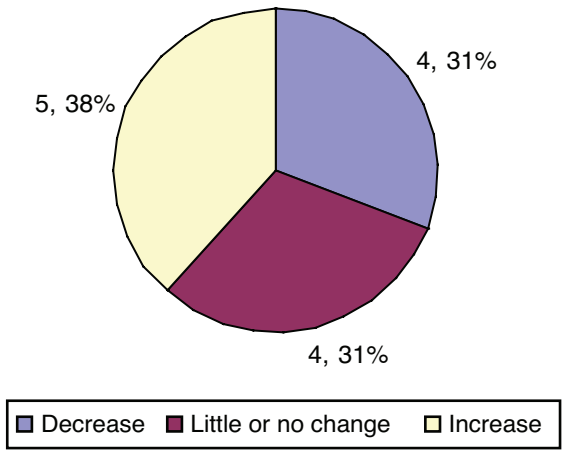



**Figure 3** **Distribution of non-native freshwater plants in Scotland. Colours represent number of non-native freshwater plants recorded per 10 x 10km square since 1970 as follows: yellow – 0; light green – 1 species; dark green – 2 species; light blue – 3 to 4 species; dark blue – 5 to 7 species**

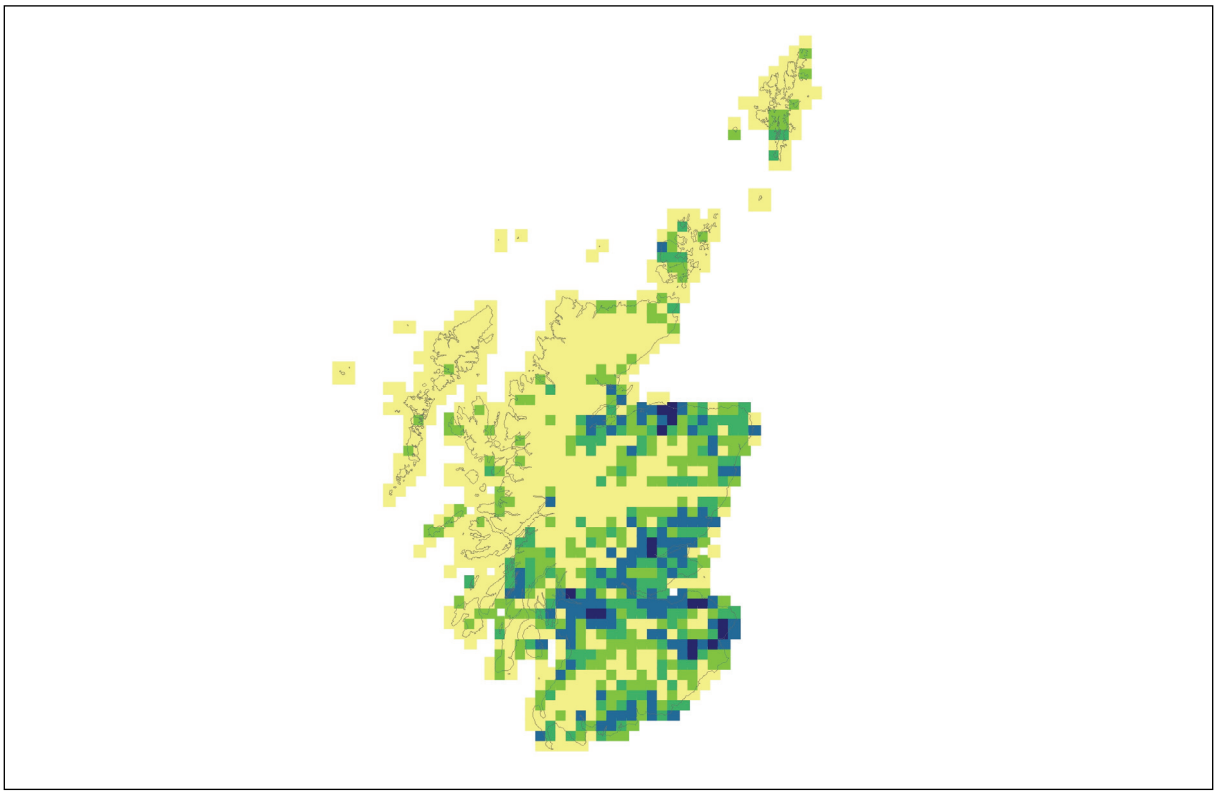


**Table 1 The nine non-native freshwater species showing the largest increases (five species) or decreases (four species) for Scotland as a whole. The figures show the change index scores for the species for Scotland and the three Scottish regions defined by Preston *et al.*, 2003**

| | | Change index score | | | |
|---|---|---|---|---|---|
| **Scientific name** | **Common name** | **Scotland** | **Highlands** | **Eastern Arable** | **South** |
| *Mentha suaveolens* | Round-leaved mint | –1.5 | –0.4 | –0.7 | –3.8 |
| *Lupinus nootkatensis* | Nootka Lupin | –0.92 | –0.48 | –0.74 | |
| *Poa palustris* | Swamp meadow-grass | –0.76 | –0.77 | | |
| *Mimulus* | | –0.53 | –0.34 | –0.50 | –0.75 |
| *Butomus umbellatus* | Flowering-rush | 0.63 | | 0.33 | 0.54 |
| *Acorus calamus* | Sweet-flag | 0.80 | | | |
| *Heracleum mantegazzianum* | Giant hgweed | 1.00 | 0.68 | 1.07 | 0.58 |
| *Impatiens glandulifera* | Indian balsam | 1.50 | 1.69 | 0.84 | 1.20 |
| *Elodea canadensis* | Canadian waterweed | 2.08 | 1.95 | 1.90 | 1.39 |

Authorship

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# 8 ARABLE WEEDS

These species are defined by their occurrence in arable land and include some perennials such as Creeping bent *Agrostis stolonifera* and Field horsetail *Equisetum arvense,* as well as the annuals commonly referred to as arable weeds. However, the perennials are few in comparison to the annuals; only those abundant in arable land are included.

## 8.1 Trends

Change has been assessed for 103 species considered to be characteristic of arable land. Of these, 25 are native (26%).

Not unexpectedly, there are more arable weeds in those areas of Scotland that have a higher proportion of arable land use (Figure 1b).

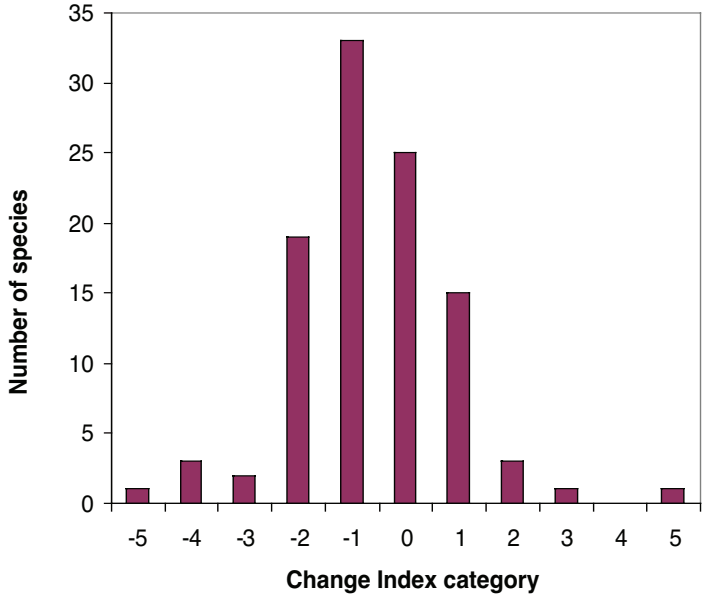
- Arable weeds have declined across the whole of Scotland since the 1930–69 period and 56% of the species assessed had a substantial decrease (Figure 2).
- The decline was especially marked for native species: 59% of non-natives had a substantial decrease compared to 48% of natives.
- All five species showing the greatest decreases (Table 1) are specialist arable weeds. Corn marigold *Chrysanthemum segetum* was once frequent in many areas of Scotland, but Stinking chamomile *Anthemis cotula*, Darnel *Lolium temulentum*, Dwarf spurge *Euphorbia exigua* and Field gromwell *Lithospermum arvense* were always restricted in their range. Many other common arable weeds have also showed a considerable, if slightly less dramatic, decrease, including Corn spurrey *Spergula arvensis,* Charlock *Sinapis arvensis* and Field pansy *Viola tricolor*.
- The species showing the greatest increase are, by contrast, a heterogeneous group. Creeping bent *Agrostis stolonifera* is a species which grows in many habitats; it was always frequent in the area of arable farming but has expanded into the Highland zone. The apparent increase of the related Black bent *Agrostis gigantea* and common ramping-fumitory *Fumaria muralis* could have resulted from under-recording in the 1950s. American willowherb *Epilobium ciliatum* is an introduced species which was very rare in Scotland in 1962 (Perring & Walters 1962) but has since become frequent in most lowland areas. Medium-flowered winter-cress *Barbarea intermedia* has increased throughout Britain, for reasons that are unclear.
- For some increasing species there are likely explanations other than herbicide avoidance or resistance. Rape *Brassica napus* has shown a particularly big increase in the Eastern Arable region where it is now widely grown and is frequent as a crop relic.
- Modest regional differences have been observed (Figure 1b). Since the Eastern Arable region has more arable weed species than the other regions, the number of species decreasing is considerably greater here (51 species) than in the Highlands (44 species) and the South West (35 species). However, the greatest proportion of species has been lost in the Highland area, where 60% or more of arable species have been lost from some Ordnance Survey 10km squares (Figure 3).
- Five arable-weed species appear to be extinct or on the verge of extinction in Scotland, with no occurrences since 1970 (Upright goosefoot *Chenopodium urbicum, Euphorbia exigua, Lolium*

*temulentum*, Annual mercury *Mercurialis annua* and Shepherd's-needle *Scandix pecten-veneris*). They were all rare before 1970, with records from at most thirteen 10km squares (*Euphorbia exigua* and *Lolium temulentum*). Several were apparently once introduced as seed impurities, so the present intensive management of arable land is not the only cause of their decline.

The marked changes in the flora of arable land in Scotland have been caused by the loss of arable land in the predominantly pastoral areas of the north and west (where in the days of horse-drawn transport and machinery there was much small-scale cultivation of cereals such as oats) and by a number of inter-related aspects of agricultural intensification in the main arable areas. The latter include the use of cleaner seed, the development of more competitive cereal varieties, the increased use of fertilisers which also enhance the density of the crop and therefore its ability to out-compete weed species, and the development of increasingly effective herbicides.

**Figure 1 Number of arable-weed species in each change index category for either a) Scotland as a whole, or b) the three regions of Scotland defined by Preston *et al.*, 2003**

a)




b)

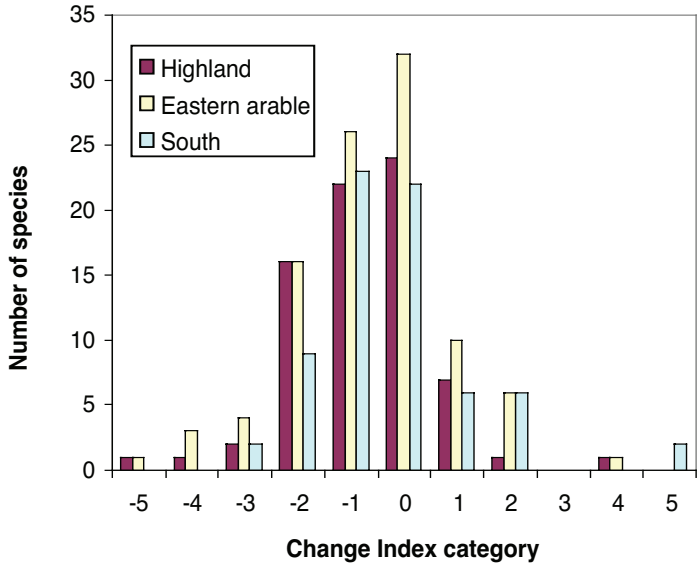


**Figure 2** **Proportion of arable-weed species showing an increase, decrease or little change (change index score of −0.5—0.5) for either a) all species, b) species that are native to Scotland or, c) species that are not native to Scotland**

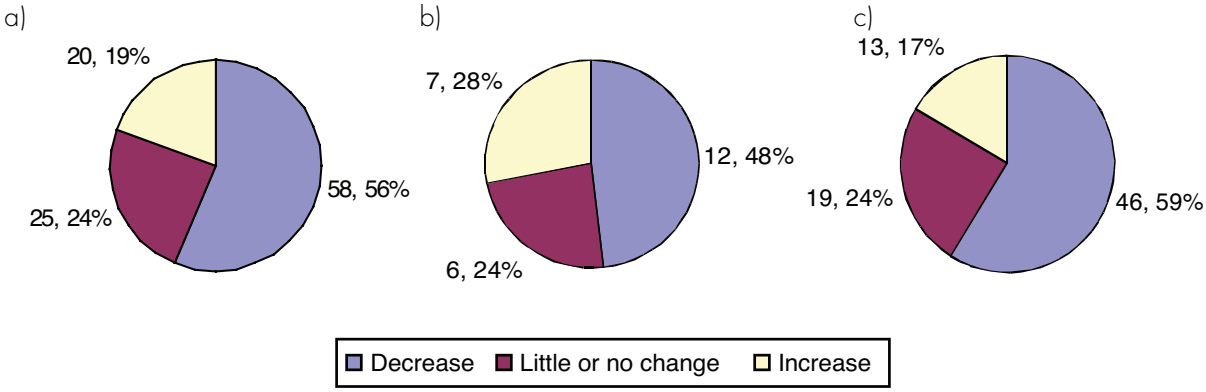



**Figure 3** **Loss of native arable plants (based on 31 species native to Scotland). Colours represent the percentage of species recorded between 1930 and 1969 which were not re-found in the 1970–99 period as follows: yellow: <5%; light green: 5 to 19%; dark green: 20 to 39%; light blue: 40 to 59%; dark blue: >60%**

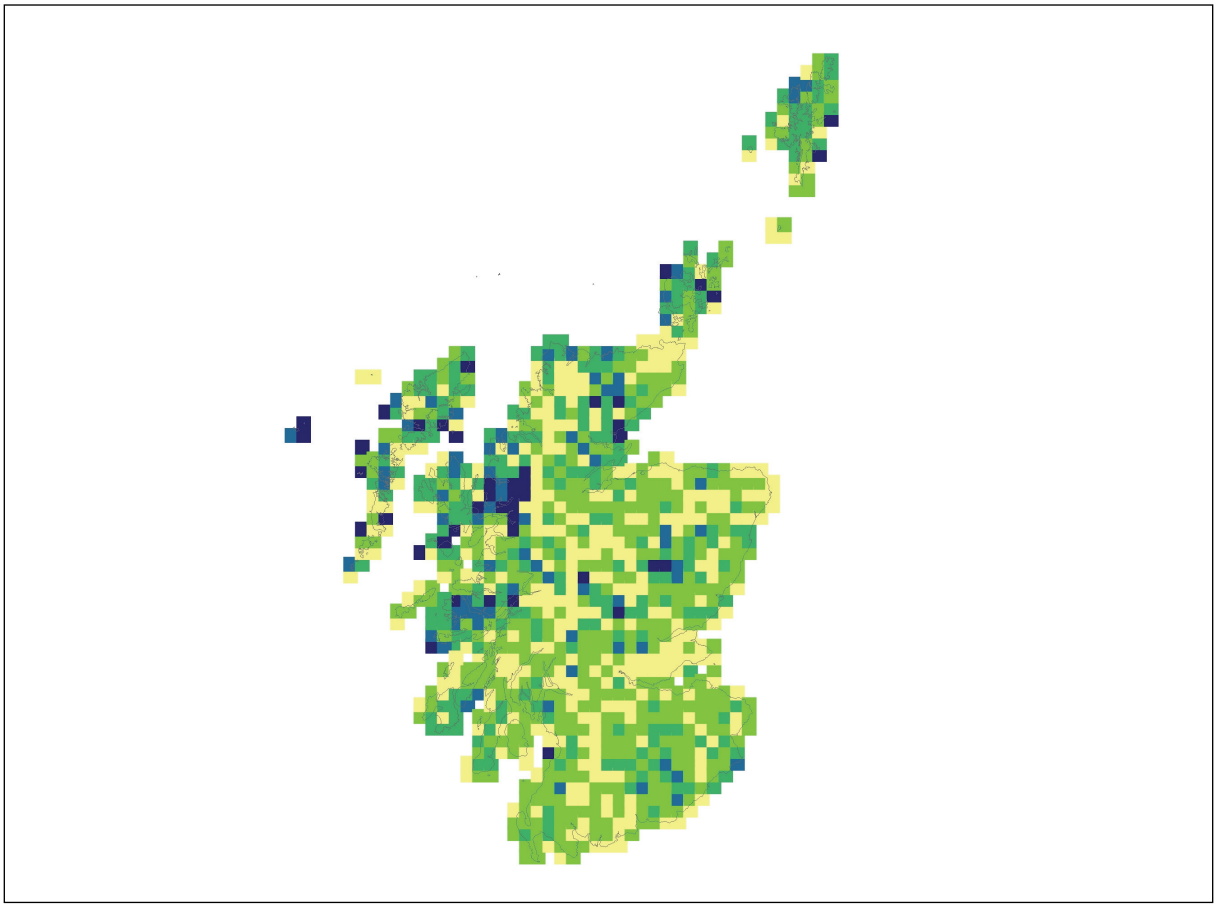


**Table 1 The 10 arable-weed species showing the largest increases (five species) or decreases (five species) for Scotland as a whole. The figures show the change index scores for the species for Scotland and the three Scottish regions defined by Preston *et al.*, 2003**

| | | Change index score | | | |
|---|---|---|---|---|---|
| **Scientific name** | **Common name** | **Scotland** | **Highlands** | **Eastern Arable** | **South** |
| *Anthemis cotula* | Stinking chamomile | –4.83 | –3.56 | –4.71 | |
| *Lolium temulentum* | Darnel | –4.43 | | –4.09 | |
| *Euphorbia exigua* | Dwarf spurge | –4.43 | | –4.09 | |
| *Chrysanthemum segetum* | Corn marigold | –3.99 | –4.57 | –2.14 | –2.88 |
| *Lithospermum arvense* | Field gromwell | –3.23 | –2.3 | –2.31 | |
| | | | | | |
| *Agrostis gigantea* | Black bent | 1.61 | 0.41 | 1.74 | 1.98 |
| *Barbarea intermedia* | Medium-flowered winter-cress | 2.02 | 0.86 | 1.7 | 2.26 |
| *Fumaria muralis* | Common ramping-fumitory | 2.06 | 1.58 | 2.34 | 1.53 |
| *Epilobium ciliatum* | American willowherb | 4.29 | | 3.7 | 4.66 |
| *Agrostis stolonifera* | Creeping bent | 4.56 | 4.25 | 1.96 | 4.67 |

Authorship

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# 9 COASTAL SPECIES

A wide range of species occur along the extensive coastline of Scotland but only a few are exclusive to the coastal zone. Coastal species are generally found in three Biodiversity Action Plan broad habitats: 'supralittoral rock' (coastal rocky habitats above high water mark), 'supralittoral sediment' (coastal habitats on sediments above high water mark, such as strandlines, dunes, shingle and machair) and 'littoral sediment' (coastal habitats on sediments below high water mark, such as saltmarshes and saltmarsh pools).

## 9.1 Trends

Change has been assessed for 100 species considered characteristic of coastal habitats. Only 20 of these species are non-native and 80 are native. Changed has been assessed in 100 species.

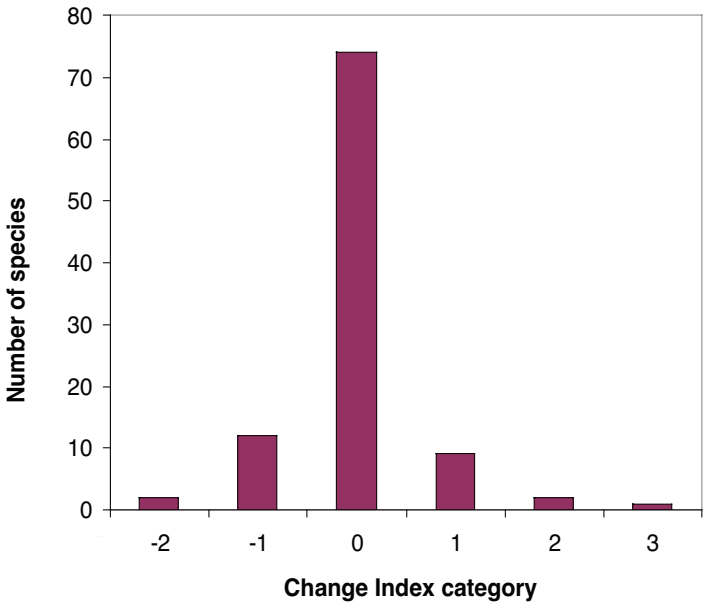
- Most species of coastal habitats show little or no change in occurrence across Scotland as a whole (Figure 1a).
- Where change occurs the magnitude is generally small, with more species decreasing (14) than increasing (12) in occurrence.
- A similar pattern of change in occurrence of coastal species was observed for each of the three Scottish regions (Figure 1b). In total, 74% of the species assessed showed little or no change, whilst 12% increased and 14% decreased in occurrence (Figure 2a).
- Two of the five species that showed greatest decline, Wild Radish *Raphanus raphanistrum* and Wild Pansy *Viola tricolor*, have both coastal and inland subspecies. The decline of *Raphanus* is completely attributable to the decline of the inland subspecies, which is a weed of arable land, as the coastal plant has increased in many areas of the UK; the decline of *Viola tricolor* is also largely attributable to the decline of the inland, weedy subspecies (Preston *et al.,* 2002a).
- The other three species showing the greatest declines are exclusively coastal. In the UK, the Curved Sedge *Carex maritima* is virtually confined to Scotland; it suffered considerable decline before 1930, but assessment of its current trend is difficult because it is a very inconspicuous and under-recorded species (Stewart *et al.,* 1994; Preston *et al.,* 2002a). Much of the decline of Glassworts *Salicornia* spp. is likely attributed to physical modification of the Scottish coastline leading to the loss of intertidal mudflats (Richie 1999). English Scurvy-grass *Cochlearia anglica* has a southern distribution in Britain and hence has few occurrences in Scotland.
- The two species that show greatest increase in occurrence (Reflexed Saltmarsh-grass *Puccinellia distans* and Lesser Sea-spurrey *Spergularia marina*) are natives that have spread inland along salt-treated roads. The explanation for the apparent increase in Yellow-sedge *Carex viridula* and Lesser Chickweed *Stellaria pallida* almost certainly lies in better recording in the 1987–99 period. Snow-in-summer *Cerastium tomentosum* is a garden escape which has increased since 1930–69, but also been recorded more efficiently in recent years (Preston *et al.*, 2002a).

Species from the coastal zone showed less change than species of other habitats. Yet, coastal habitats remain vulnerable to a wide range of damaging activities, including tourism, excavation of sand and shingle, and construction of hard defences. Although limited change in occurrence of coastal species was

recorded, continuation of sea-level rise, increased storminess and further development for urban or industrial use in particular may put pressure particularly on soft coasts such as salt marshes, dune and shingle habitats, and generate substantial changes in the occurrence of species in the future.

**Figure 1 Number of coastal species in each change index category for either a) Scotland as a whole, or b) the three regions of Scotland defined by Preston *et al.*, 2003**

a)




b)

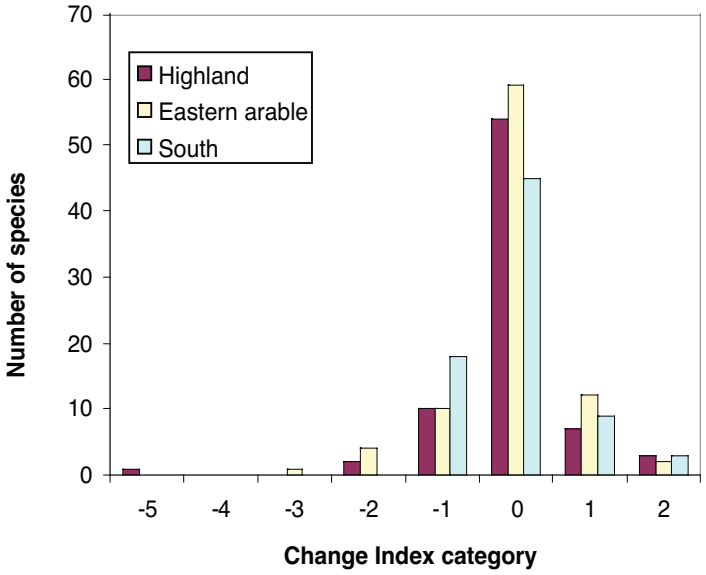


**Figure 2** **Proportion of coastal species showing an increase, decrease or little change (change index score of –0.5—0.5) for either a) all species, b) species that are native to Scotland or, c) species that are not native to Scotland**

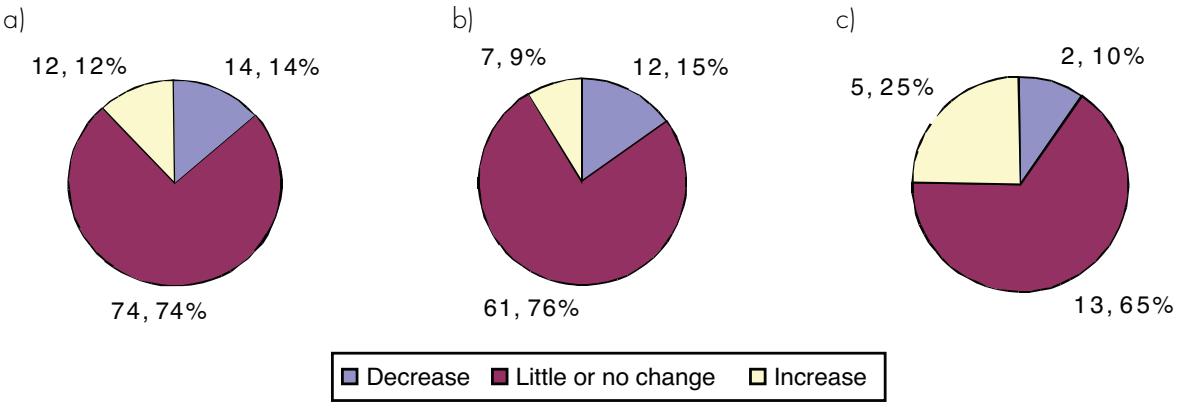



**Table 1** **The 10 coastal species showing the largest increases (five species) or decreases (five species) for Scotland as a whole. The figures show the change index scores for the species for Scotland and the three Scottish regions defined by Preston *et al.*, 2003**

| | | Change index score | | | |
|---|---|---|---|---|---|
| **Scientific name** | **Common name** | **Scotland** | **Highlands** | **Eastern Arable** | **South** |
| *Raphanus raphanistrum* | Wild radish | –2.25 | –2.43 | –2.14 | –1.17 |
| *Viola tricolor* | Wild pansy | –2 | –2.04 | –1.66 | –1.36 |
| *Carex maritima* | Curved sedge | –1.34 | 0.25 | –2.74 | |
| *Salicornia* | Glassworts | –1.21 | –1.08 | –0.22 | –1.3 |
| *Cochlearia anglica* | English scurvygrass | –1.08 | –4.6 | –1.34 | 0.32 |
| *Stellaria pallida* | Lesser chickweed | 1.22 | | 1.46 | |
| *Cerastium tomentosum* | Snow-in-summer | 1.4 | 1.21 | 1.1 | 1.06 |
| *Carex viridula* | Yellow-sedge | 1.74 | 1.98 | 0.8 | 1.79 |
| *Puccinellia distans* | Reflexed saltmarsh-grass | 2.41 | 1.95 | 2.24 | |
| *Spergularia marina* | Lesser sea-spurrey | 2.5 | 2.09 | 2.2 | 2.37 |

## Authorship

R. van der Wal – Centre for Ecology and Hydrology

# 10 BUILT-UP AREAS AND GARDENS

This habitat includes a wide range of areas dominated by man-made structures such as urban and rural settlements, industrial estates, farm buildings, waste and derelict ground, urban parks, domestic gardens, allotments, roads and railways in urban areas (McGowan *et al.*, 2002). Amenity grasslands, such as golf courses, sports fields and country parks, are classified as grasslands and therefore excluded from this category. Also excluded are areas of urban farmland and remnant semi-natural areas that happen to fall within city boundaries, such as Arthur's Seat in Edinburgh.

Built-up areas and gardens provide a habitat quite distinct from adjacent ground that is not built-up, and may offer refuge to species where intensive farming has reduced plant species diversity. Parks and gardens provide a source of non-native plants. Several such species cause considerable concern as they are form dense stands which partially or entirely exclude other species (eg Japanese knotweed *Fallopia japonica*, Giant hogweed *Heracleum mantegazzianum*).

## 10.1 Trends

Change has been assessed for 143 species considered as characteristic of Built-up areas and garden. Of these, 21 are native and 122 are non-native.

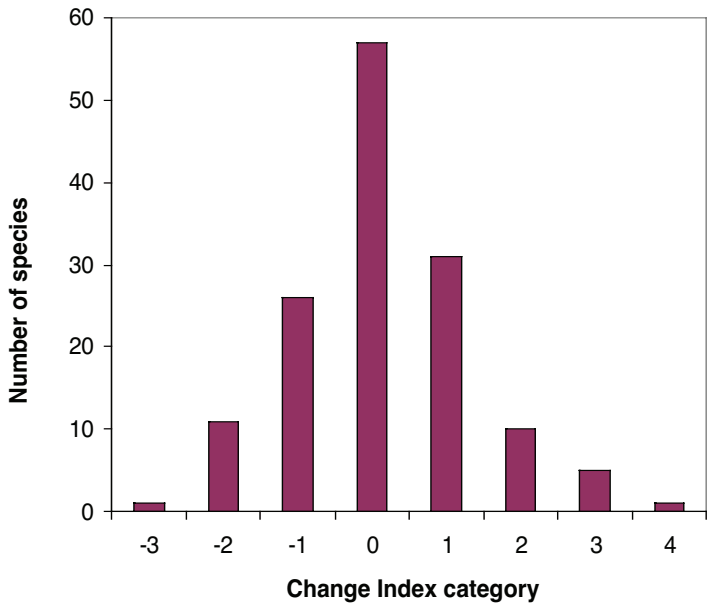
- Across Scotland as a whole, 57 species, more than one-third of the species of Built-up areas and gardens for which data are available, show little or no change. A total of 47 species (33%) increased and 39 (27%) decreased in occurrence (Figure 2a).
- The Eastern Arable region had more urban species than the other regions (Figure 1b); these showed proportionally less change.
- The number of native species which have shown a substantial decline balances the number which have increased (Figure 2). The four native species that increased in occurrence include common weeds such as Procumbent Pearlwort *Sagina procumbens* and Dandelion *Taraxacum* spp.
- Non-native species changed (increased or decreased) more than native species in this habitat.
- Four out of the five species that showed greatest decline were introduced before AD 1500 ('archaeophytes'); only Bastard cabbage *Rapistrum rugosum* (Table 1) is a recent introduction ('neophyte'). Two of the most declining species, Charlock *Sinapis arvensis* and Red dead-nettle *Lamium purpureum*, are also arable weeds and have declined because of the loss of arable land in the Highlands and South. Caraway *Carum carvi* has declined because it is now seldom cultivated, though it remains well naturalized on Shetland. The other two species, Annual mercury *Mercurialis annua* and Bastard cabbage *Rapistrum rugosum*, were probably always casual. The decline of *M. annua*, a strongly urban species which is simultaneously increasing in England, is remarkable but there is no obvious explanation for it.
- Change at the 10km square scale is rather a coarse scale for urban species, because the urban area is relatively small. Thus of the species showing greatest increase, Cherry laurel *Prunus laurocerasus,* Himalayan cotoneaster *Cotoneaster simonsii*, Montbretia *Crocosmia x crocosmiifolia* and Dotted loosestrife *Lysimachia punctata* may not necessarily be increasing in urban areas but in the wider

countryside. The greatest increase in occurrence is recorded for American willowherb *Epilobium ciliatum*. First collected in 1891, this weed was unrecognised until the 1930s. In the first *Atlas of the British Flora* (Perring & Walters 1962) it was recorded from only three 10km squares in Scotland. The big increase in Scotland was in the decade to 1970, by which time it had been found in 205 squares; thereafter it expanded to 305 squares. It is now well-established in Scotland, where it spreads readily by seed, often in newly disturbed sites.

Factors which have affected the flora of Built-up areas and gardens include the spread of non-native species from gardens into the wild. The precise reasons for this spread have not been studied in detail, but probably include the increasing commercial availability of horticultural plants, a tendency to 'fly-tip' surplus garden plant material on roadside verges (particularly from cars), the increasing volumes of topsoil transported long distances and simply the gradual spread of species into the wild as time goes on. The decrease of species may relate to the decreasing popularity of some older introduction, and the increasing use of herbicides to maintain the 'tidy' appearance of some urban areas.

**Figure 1 Number of species from Built-up areas and gardens in each change index category for either a) Scotland as a whole, or b) the three regions of Scotland defined by Preston *et al.*, 2003**

a)



b)

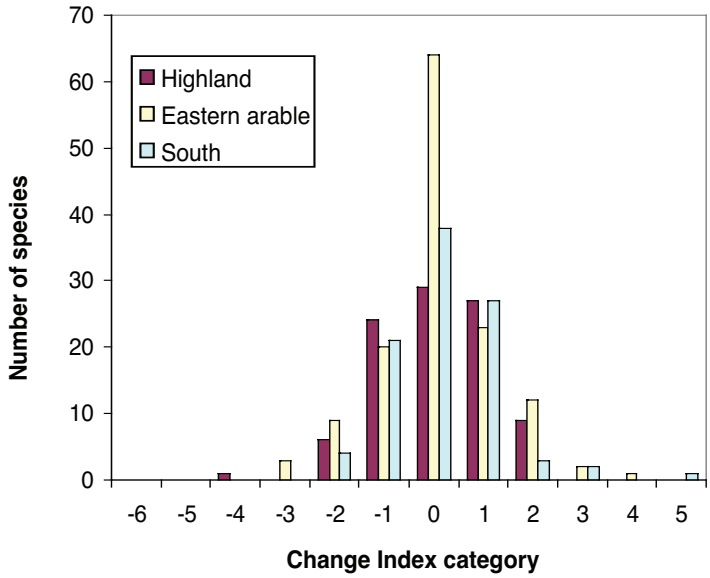



**Figure 2** **Proportion of species from Built-up areas and gardens showing an increase, decrease or little change (change index score of –0.5—0.5) for either a) all species, b) species that are native to Scotland or, c) species that are not native to Scotland**

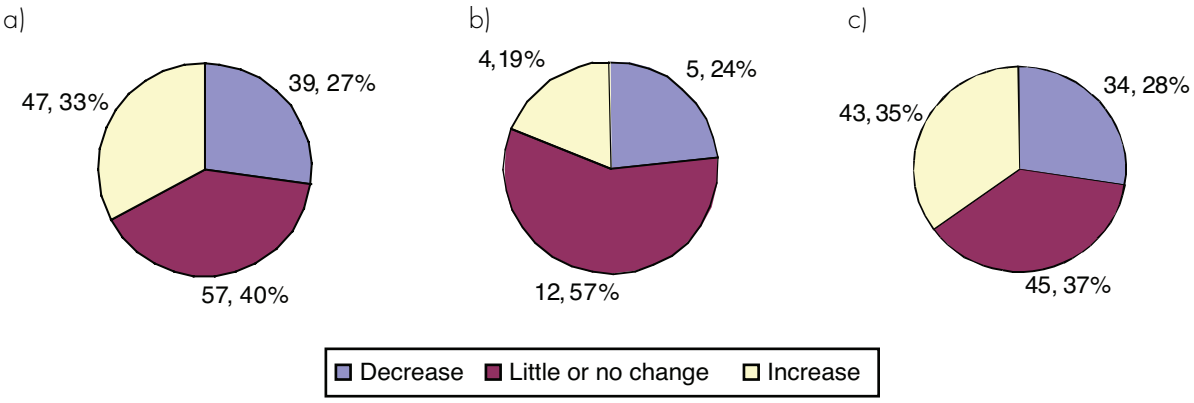


**Table 1 The 10 species from Built-up areas and gardens showing the largest increases (five species) or decreases (five species) for Scotland as a whole. The figures show the change index scores for the species for Scotland and the three Scottish regions**

| | | Change index score | | | |
|---|---|---|---|---|---|
| **Scientific name** | **Common name** | **Scotland** | **Highlands** | **Eastern Arable** | **South** |
| *Carum carvi* | Caraway | –2.85 | –1.25 | –5.68 | |
| *Rapistrum rugosum* | Bastard cabbage | –2.37 | | –2.1 | |
| *Mercurialis annua* | Annual mercury | –2.32 | | –2.72 | |
| *Sinapis arvensis* | Charlock | –2.3 | –2.24 | –1.54 | –2.28 |
| *Lamium purpureum* | Red dead-nettle | –1.93 | –2.12 | –0.7 | –1.67 |
| *Prunus laurocerasus* | Cherry laurel | 2.6 | 1.7 | 2.19 | 2.57 |
| *Cotoneaster simonsii* | Himalayan cotoneaster | 2.79 | 2.4 | 2.25 | 2.47 |
| *Crocosmia aurea x pottsii (C. x crocosmiiflora)* | Montbretia | 2.86 | 2.35 | 2.4 | 2.61 |
| *Lysimachia punctata* | Dotted loosestrife | 3.07 | 2.47 | 1.88 | |
| *Epilobium ciliatum* | American willowherb | 4.29 | | 3.7 | 4.66 |

Authorship

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# 11 LINEAR AND BOUNDARY FEATURES

This broad habitat is almost completely man-made, has a strong lowland bias and provides distinctive habitats for species that might not otherwise be present in the landscape.

Included in this broad habitat are linear habitats such as roadside verges, tracks and railway embankments, and field boundaries (McGowan *et al.,* 2002). Linear habitats are generally associated with transport features and are mostly confined to lowland areas, reflecting the greater density of road and rail links in the central belt and eastern lowlands of Scotland. These man-made features do, however, provide potential long-distance migration routes for plants.

Boundaries include hedgerows, lines of trees, walls, fences and stone and earth banks. In general, these are all associated with farmland. Fences are the most common boundary type but walls are also common, being found in both lowland and upland farms. In Scotland, the most common species recorded at these boundary types are grasses, including species typical of improved grasslands (McGowan *et al.,* 2002). Hedgerows are less common in Scotland and are mostly found in lowland areas and are often dominated by hawthorn. Other species associated with hedges are usually typical of low-management fertile ground and include several weed species (McGowan *et al.,* 2002).

## 11.1 Trends

Change has been assessed for 324 species considered to be associated with these habitats. These comprise 117 native and 207 non-native species.

- Many species of linear and boundary habitats (141) showed little or no change (Figure 1). A larger total number, 183, showed marked change, with the number of species increasing more or less balanced by those decreasing.
- Non-native species slowed slightly more change, particularly losses, than native species (Figure 2). However, four of the five species that showed the greatest increases in occurrence were also non-native (Table 1).
- Four of the five species with the largest decreases were non-native, only heath cudweed *Gnaphalium sylvaticum* being native to Scotland. This species is found in tracks and forest rides and is declining throughout its British range (Preston *et al.,* 2002a).
- Meadow brome *Bromus commutatus* is not native in Scotland and declined even before the start of the current study period (1930) due to agricultural improvement of meadow habitats.
- The other three species are ancient introductions ('archaeophytes') and are generally associated with roadsides. Caraway *Carum carvi* and Chicory *Cichorium intybus* were both cultivated more widely in the past and have decreased in Britain (Preston *et al.,* 2002a). Annual mercury *Mercurialis annua* is increasing in England, but has a southern distribution even there; its decline in Scotland reflects a retreat to its core distribution, presumably attributable to it being less frequently introduced.
- Four of the five most strongly increasing species are also amongst the five most strongly increasing species in built-up areas. This is no coincidence, because built-up areas and linear habitats are often

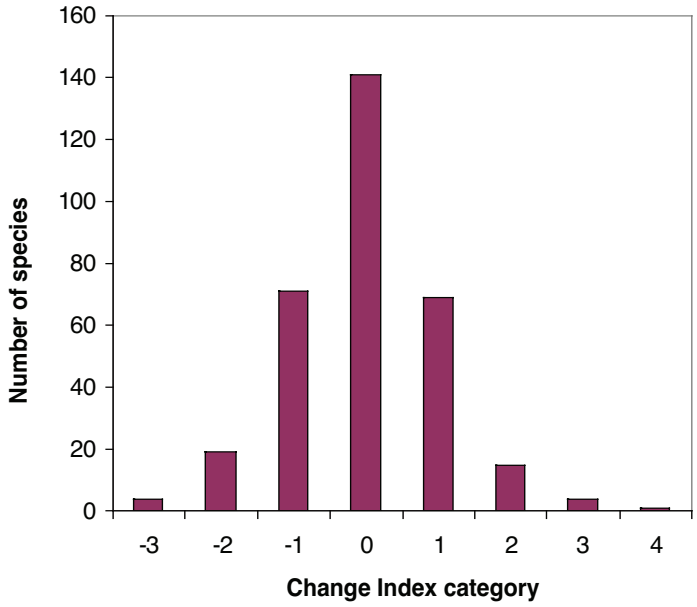
subject to similar human disturbance. The exception is the salt-loving lesser sea-spurrey *Spergularia marina*, which has spread extensively on salted roads.

- Three of the five increasing species have escaped from gardens. The Rhizomatous montbretia *Crocosmia* x *crocosmiiflora* and dotted loosestrife *Lysimachia punctata* are often dumped by roads rather than being planted there. The shrub Himalayan cotoneaster *Cotoneaster simonsii* is a garden escape, but is dispersed by birds.
- The most strongly increasing species of linear habitats is American willowherb *Epilobium ciliatum*, which spread widely in Scotland in the decade 1960–69 and continued to increase, from 205–305 squares, in the subsequent three decades.

The trends in archaeophyte and neophyte species described above appear similar to the general trends of these species in Scotland (Preston *et al.*, 2003). Changes in agricultural management practices seem responsible for some losses in linear and boundary habitats, whereas road management such as salt treatment of roads is responsible for some gains. The dumping of garden waste is another means of introduction.

**Figure 1 Number of species from Linear and boundary features in each change index category for either a) Scotland as a whole, or b) the three regions of Scotland defined by Preston *et al.*, 2003**

a)



b)

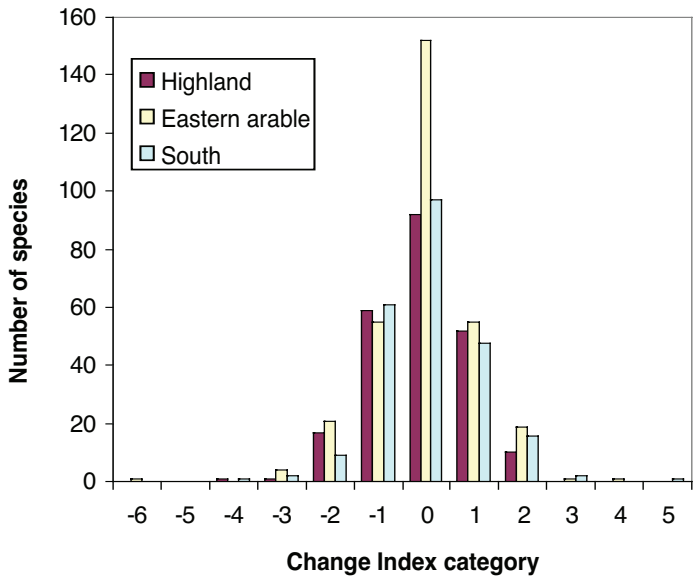



**Figure 2** **Proportion of species from Linear and boundary features showing an increase, decrease or little change (change index score of –0.5 to 0.5) for either a) all species, b) species that are native to Scotland or, c) species that are not native to Scotland**

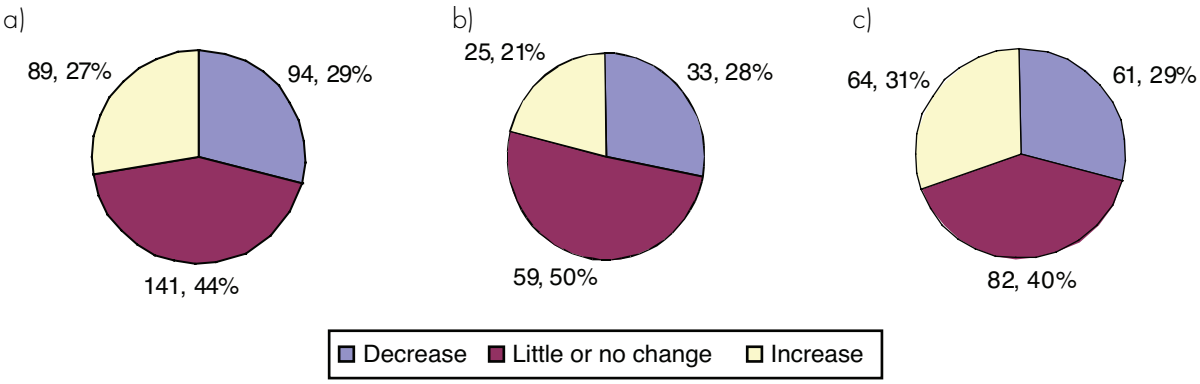


**Table 1 The 10 species from Linear and boundary features showing the largest increases (five species) or decreases (five species) for Scotland as a whole. The figures show the change index scores for the species for Scotland and the three Scottish regions**

| | | Change index score | | | |
|---|---|---|---|---|---|
| **Scientific name** | **Common name** | **Scotland** | **Highlands** | **Eastern Arable** | **South** |
| *Cichorium intybus* | Chicory | –3.09 | –1.54 | –3.27 | –2.65 |
| *Carum carvi* | Caraway | –2.85 | –1.25 | –5.68 | |
| *Bromus commutatus* | Meadow brome | –2.74 | –0.83 | –2.45 | |
| *Gnaphalium sylvaticum* | Heath cudweed | –2.74 | –2.11 | –2.22 | –2.85 |
| *Mercurialis annua* | Annual mercury | –2.32 | | –2.72 | |
| *Spergularia marina* | Lesser sea-spurrey | 2.5 | 2.09 | 2.2 | 2.37 |
| *Cotoneaster simonsii* | Himalayan cotoneaster | 2.79 | 2.4 | 2.25 | 2.47 |
| *Crocosmia aurea x pottsii (C. x crocosmiiflora)* | Montbretia | 2.86 | 2.35 | 2.4 | 2.61 |
| *Lysimachia punctata* | Dotted loosestrife | 3.07 | 2.47 | 1.88 | |
| *Epilobium ciliatum* | American willowherb | 4.29 | | 3.7 | 4.66 |

Authorship

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# 12 BASE-POOR SUBSTRATES

Habitats on base-poor substrates occupy large areas of the Highands and Southern Uplands of Scotland. Such habitats have suffered in much of Europe as a result of agricultural intensification combined with the effects of atmospheric nitrogen deposition (Latour & Reiling, 1995). Many of the species characteristic of the Upland broad habitat are also characteristic of base-poor substrates; but many are not, and some species of base-poor substrates occur more frequently in the lowlands.

The species of base-poor substrates can be identified from their 'indicator values' for acidity. A system of such indicator values was set out for central Europe by Ellenberg (1979) and adapted for the British Isles by Hill *et al.,* (1999). According to this system, plants are ranged on a scale from 1 (most acid-loving) to 9 (most characteristic of limestone and other basic soils). Species with the three most acid indicator values on the Ellenberg scale were selected as those most characteristic of base-poor substrates. The indicator values were defined by Hill *et al.,* (1999) as follows:

1. Indicator of extreme acidity, never found on weakly acid or basic soils (eg Bog-rosemary *Andromeda polifolia*, Stag's-horn clubmoss *Lycopodium clavatum,* Cloudberry *Rubus chamaemorus,* Dwarf gorse *Ulex minor*);
2. Intermediate between 1 and 3 (eg Heather *Calluna vulgaris*, Round-leaved sundew *Drosera rotundifolia*, Heath milkwort *Polygala serpyllifolia*);
3. Acidity indicator, mainly on acid soils, but exceptionally also on nearly neutral ones (eg Brown bent *Agrostis vinealis*, Heath spotted-orchid *Dactylorhiza maculata*, Heath bedstraw *Galium saxatile*, Bracken *Pteridium aquilinum*).

## 12.1 Trends

Change has been assessed for 81 species considered as characteristic of base-poor habitats, of which only one, Rhododendron *Rhododendron ponticum* is non-native.

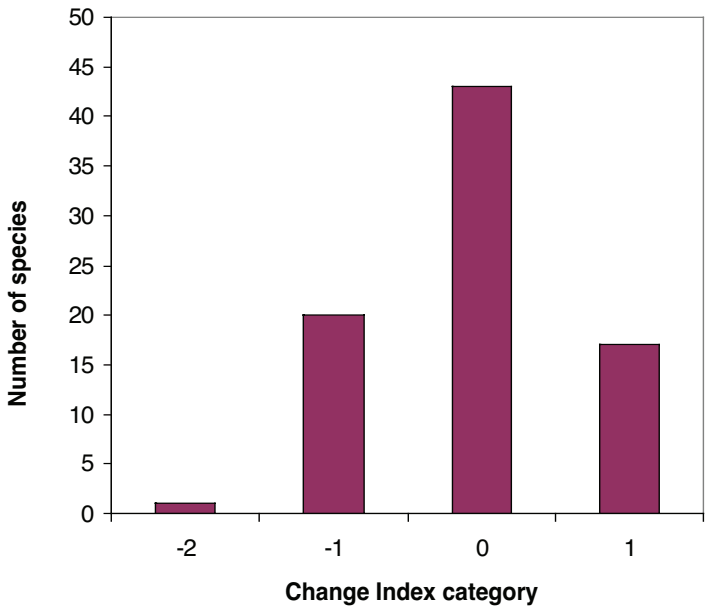
- 44 species showed little or no change, with the 21 decreasing species more or less matched by 16 increasing species (Figures 1a & 2). There was insufficient data to quantify the change in a further 15 species.
- The pattern of change shows marked regional variation, with increasing species outnumbering decreasing species in the Highland region. The reverse trend is seen in the Eastern Arable region, where decreasing species outnumber increasing species. The South region is intermediate, with increases and decreases more or less balanced (Figure 1b).
- The five species showing the greatest decrease are from a variety of habitats. Dodder *Cuscuta epithymum* is a heathland plant that has suffered a marked decline throughout Britain except for the extreme south. Small cow-wheat *Melampyrum sylvaticum* is a woodland plant. Wilson's filmy-fern *Hymenophyllum wilsonii* remains common in much of western Scotland but has apparently declined in the Southern Uplands and central Highlands. Petty whin *Genista anglica* is a heathland plant that has declined in the extreme east and in the Southern Uplands. The data for Scots pine *Pinus sylvestris* include planted trees, and there is no reason to suppose that it has decreased; the apparent decline is likely to be an artefact of recording.

- Four of the five species showing the greatest decrease are common or very common upland plants that were poorly recorded in the first recording period, especially in the Highlands. Previous poor recording of 'dull' habitats in the Highlands probably explains the tendency of base-poor species to show an apparent increase in that area. The only species of the top five with an increase which is not attributable to improved recording is *Rhododendron ponticum*, well known as an invasive plant of moorlands and acid woods.

The changes in species of base-poor habitats have occurred mainly in the east and south. Almost no species apart from *R. ponticum* have shown a genuine increase. Some decreases have been caused by destruction and overgrowth of heathland. Afforestation, nutrient-enrichment, grazing and trampling have been suggested as causes for the decline of *Melampyrum sylvaticum* (Preston *et al.*, 2002a). This is, however, a special case, and most of the changes, generally rather small, are probably due to loss of heathland, both as a result of afforestation and of agricultural improvement.

**Figure 1 Number of species of base-poor substrates in each change index category for a) Scotland as a whole, or b) the three regions of Scotland defined by Preston *et al.*, 2003**

a)



b)

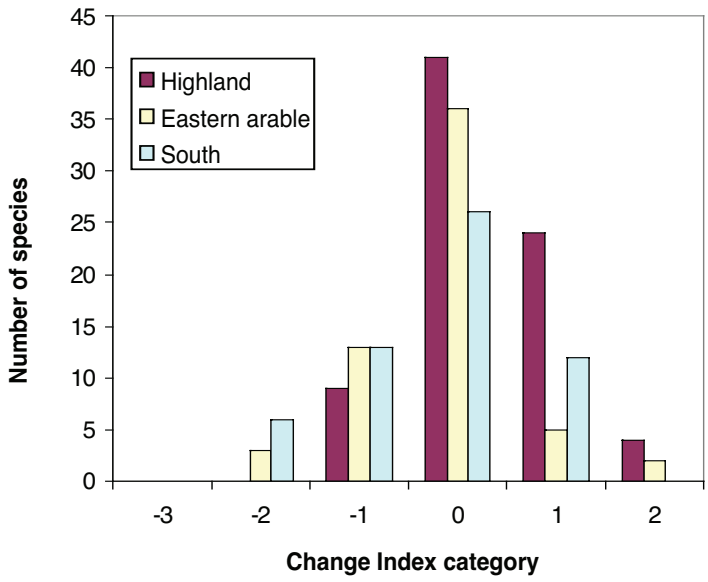



**Figure 2** **Proportion of species of base-poor substrates showing an increase, decrease or little change (change index score of –0.5—0.5).**

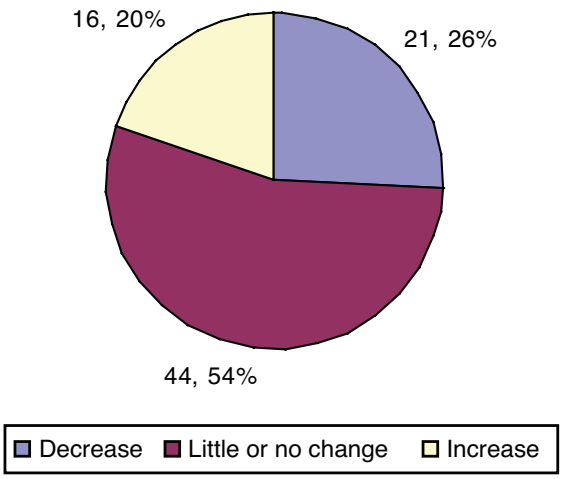


**Table 1 The 10 Scottish species of base-poor substrates showing the largest increases (five species) or decreases (five species) for Scotland as a whole. The figures show the change index scores for the species for Scotland and the three Scottish regions defined by Preston *et al.*, 2003**

| | | Change index score | | | |
|---|---|---|---|---|---|
| **Scientific name** | **Common name** | **Scotland** | **Highlands** | **Eastern Arable** | **South** |
| *Cuscuta epithymum* | Dodder | –1.87 | | | |
| *Melampyrum sylvaticum* | Small cow-wheat | –1.36 | –1.17 | | |
| *Hymenophyllum wilsonii* | Wilson's filmy-fern | –1.19 | –0.93 | 0.21 | –1.73 |
| *Pinus sylvestris* | Scots pine | –0.90 | –0.73 | –0.28 | –1.51 |
| *Genista anglica* | Petty win | –0.88 | –0.18 | –1.27 | –1.44 |
| *Potentilla erecta* | Tormentil | 1.22 | 1.88 | –0.19 | 0.43 |
| *Carex binervis* | Green-ribbed sedge | 1.34 | 0.79 | 0.97 | 1.14 |
| *Rhododendron ponticum* | Rhododendron | 1.37 | 1.20 | 1.42 | 0.97 |
| *Luzula multiflora* | Heath wood-rush | 1.44 | 1.10 | 0.82 | 0.93 |
| *Viola palustris* | Marsh violet | 1.45 | 2.13 | 0.47 | 0.37 |

Authorship

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## 13 DATA SOURCES

Change index values have been calculated for each species that was mapped in the 1962 *Atlas* and recorded from more than 5 10km squares in the 1930–69 time period. The ***change index*** (Telfer *et al.*, 2002) has been calculated for Scotland as a whole, and for three different regions within Scotland. Plants with a change index of 0.5 or more are regarded as having undergone a substantial increase and are classed as increasing species in the trend profiles. Plants with an index of 0.5 or less are regarded as decreasing species. These figures are arbitrary ones, chosen as a review of the values for all species suggests that values above 0.5 or below –0.5 represent substantial changes. Plants with a change index value between 0.5 and –0.5 are regarded as having undergone little or no change.

There are two major limitations to the change index:

- an assumption of the method is that all species are recorded evenly. If a species or group of species was neglected in one survey but recorded adequately in the other, the change index for that species or group will be misleading. The best example is probably the native freshwater species, which were poorly recorded in the 1930–69 period and therefore appear to have increased when compared with terrestrial species which were adequately recorded in both surveys;
- species that were not mapped in the 1962 *Atlas* have not been analysed. This includes a few native plants which are difficult to identify, and many non-native species. The non-native species were not mapped because they were rare (and recorders were less assiduous in recording rare introductions in the 1930–69 period than they are now), or because they had not yet arrived in Britain.

The species' distributions analysed by this index are at the 10km square scale. There have almost certainly been changes which are not detectable at this scale. Some plants may have become more abundant, or less abundant, within their existing range, but this change will not be picked up if the distribution in 10km squares remains unaltered. However, major changes of abundance within squares are likely to be accompanied by some corresponding change in the national distribution, such as a decline at the edge of the species' range. More intensive local surveys are needed to detect these fine-scale changes. The Countryside Survey (Smart *et al.*, 2003), for example, has demonstrated trends in the abundance of numerous common plants between 1978 and 1998 at finer scales.

The following summary has been prepared for inclusion in all profiles:

The main data sources for assessment of trends in Scottish vascular plants were *Atlas of the British Flora* (Perring and Walters, 1962) and *New Atlas of the British and Irish Flora* (Preston *et al.*, 2002). From the data compiled for these atlases, species frequencies (ie the number of occupied 10km squares divided by the total number of 10km squares) were compared between (a) 1930–69 and (b) 1987–99. Trends have been corrected for differences in recording intensity using a *change index* (CI). This compares the observed change in frequency between periods (a) and (b) with that expected, taking into account the observed frequency of the species in period (a). Species for which CI is less than –0.5 are, relative to the general run of species, decreasing; species for which CI is greater than 0.5 are increasing. No change index could be calculated for species that were not included in the 1962 *Atlas*.

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## APPENDIX 1 NOTES ON SPECIES DATABASE/SPREADSHEET

Summary information listed below is contained in an Excel spreadsheet table. Only columns A, B and C are reproduced here.

**Column A** is the Biological Records Centre 'aggcode' for the taxon (species or aggregation of infraspecific taxon).

**Columns B and C** give scientific and common names of the species included in the spreadsheet. Species included are 1) all native or 'native or alien' in Scotland plus 2) all non-native species which have been allocated a change index value for Scotland. A number of additional entries have been added to include additional species on the list of freshwater species provided by SNH; full entries are not provided in the spreadsheet for these taxa.

**Columns D–H** give the native status in the British Isles (following Preston *et al.*, 2002a)

**D** Native

**E** 'Native or alien'

**F** Non-native

**G** Archaeophyte

**H** Neophyte

'1' indicates that the status applies. Taxa have a single entry in columns D, E, G or H; column F includes taxa with a positive entry in columns G or H.

**Column I** (added to list of columns requested by SNH) indicates plants which are native in Scotland (following Preston *et al.*, 2002a; see also Preston 2003).

**Column J** indicates plants mentioned as under-recorded in the text of Preston *et al.*, (2002a; see Preston *et al.*, 2003). These references were based on the text provided by individual caption authors who were subject to severe space constraints. There was no attempt to ensure comparability between taxa so a species such as *Adoxa moschatellina* which is marked as under-recorded may be less under-recorded than a species such as *Rosa caesia* which is not. This assessment must therefore be treated with caution.

**Columns K–AE** indicate the attributions of species to Broad Habitats made by Preston *et al.*, 2003.

**Columns AF–AO** list the species included in the different Habitat Profiles. The list for the profile of species of base-poor substrates includes all species with Ellenberg R values 1–3.

**Columns AP–AY** list the different figures used to calculate the change and dynamism indexes for Britain (see Preston *et al.*, 2003). Some taxa are treated as aggregates (eg *Agrostis canina* agg.) as they were only recorded at this level in the fieldwork for the 1962 *Atlas* – these therefore do not have entries for the segregates (*A. canina* and *A. vinealis*).

**AP 'GB Pre70'** Number of 10km squares in Britain in which species was recorded pre-1970.

**AQ 'GB Post87'** Number of 10km squares in Britain in which species was recorded 1987–99.

**AR 'GB Extinctions'** Number of 10km squares in Britain in which species was recorded pre-1970 but not 1987–99.

**Appendix 1** *(continued)*

**AS 'GB Extinctions proportions'** Proportion of 10km squares in Britain in which species was recorded pre-1970 but not 1987–99.

**AT 'GB Colonisations'** Number of 10km squares in Britain in which species was recorded 1987–99 but not pre-1970.

**AU 'GB Colonisations proportions'** Proportion of 10km squares in Britain in which species was recorded 1987–99 but not pre-1970.

**AV 'GB Never_present'** Number of 10km squares in Britain in which species was recorded neither pre-1970 nor in 1987–99.

**AW 'GB Always present'** Number of 10km squares in Britain in which species was recorded both pre-1970 and in 1987–99.

**AX 'GB Dynamism index'** For explanation, see Preston *et al.,* (2003).

**AY 'GB Dynamism score'** For explanation, see Preston *et al.,* (2003).

**Columns AZ–BC** give the change index values for the following areas:

**AZ 'Scot'** Scotland.

**BA 'SNHHG'** Scotland Highland region (see Preston *et al.*, 2003).

**BB 'SNHEA'** Scotland Eastern Arable region (see Preston *et al.,* 2003).

**BC 'SNHSW'** Scotland South Western pasture region (see Preston *et al.,* 2003).

Species lack a change value if they were recorded in 5 or fewer 10km squares before 1970; similarly some have values for Scotland but not for some or all of the component regions.

**Columns BD–BK** give equivalent figures to AP–AW for the Eastern Arable region of Scotland.

**Columns BL–BS** give equivalent figures to AP–AW for the South Western pasture region of Scotland.

**Columns BT–CA** give equivalent figures to AP–AW for the Highland region of Scotland.

**Columns CB–CI** give equivalent figures to AP–AW for Scotland.

**Column CJ** code to status in Scotland.

I = Increasing

D = Decreasing

S = Stable (little or no change)

U1 = Native species without a change index for Scotland

U2 = Non-native species without a change index for Scotland.

**Column CK** gives species Freshwater species as classified by SNH.

**Column CL** gives status (Native or Introduced) of freshwater species in Britain.

## APPENDIX 1 SPECIES ENTRIES

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1364 | *Oenanthe fistulosa* | Tubular water-dropwort |
| 0920 1886 | *Sedum villosum* | Hairy stonecrop |
| 0920 1322 | *Myosotis scorpioides* | Water forget-me-not |
| 0920 371 | *Carex elata* | Tufted-sedge |
| 0910 723 | *Equisetum variegatum* | Variegated horsetail |
| 0920 1348 | *Rorippa nasturtium-aquaticum* agg. | |
| 0920 1008 | *Hypericum elodes* | Marsh St John's-wort |
| 0920 1691 | *Rhynchospora alba* | White beak-sedge |
| 0920 1891 | *Senecio aquaticus* | Marsh ragwort |
| 0920 294 | *Calamagrostis stricta* | Narrow small-reed |
| 0920 1363 | *Oenanthe crocata* | Hemlock water-dropwort |
| 0920 340 | *Carex acuta* | Slender tufted-sedge |
| 0920 1055 | *Juncus balticus* | Baltic rush |
| 0920 1648 | *Ranunculus circinatus* | Fan-leaved Water-crowfoot |
| 0920 2003 | *Stachys palustris* | Marsh woundwort |
| 0920 1664 | *Ranunculus trichophyllus* | Thread-leaved water-crowfoot |
| 0920 1817 | *Samolus valerandi* | Brookweed |
| 0920 224 | *Baldellia ranunculoides* | Lesser water-plantain |
| 0920 1272 | *Mentha aquatica* | Water mint |
| 0920 2166 | *Veronica beccabunga* | Brooklime |
| 0920 241 | *Bidens cernua* | Nodding bur-marigold |
| 0920 1860 | *Bolboschoenus maritimus* | Sea club-rush |
| 0920 137 | *Apium nodiflorum* | Fool's-water-cress |
| 0920 1038 | *Iris pseudacorus* | Yellow iris |
| 0920 1872 | *Scutellaria galericulata* | Skullcap |
| 0920 242 | *Bidens tripartita* | Trifid bur-marigold |
| 0920 433 | *Catabrosa aquatica* | Whorl-grass |
| 0920 1053 | *Juncus alpinoarticulatus* | Alpine rush |
| 0920 1219 | *Lycopus europaeus* | Gypsywort |
| 0920 1530 | *Persicaria hydropiper* | Water-pepper |
| 0920 1646 | *Ranunculus baudotii* | Brackish water-crowfoot |
| 0910 1474 | *Pilularia globulifera* | Pillwort |
| 0910 1216 | *Lycopodiella inundata* | Marsh clubmoss |
| 0920 1569 | *Potamogeton lucens* | Shining pondweed |
| 0920 1579 | *Potamogeton rutilus* | Shetland pondweed |
| 0920 1227 | *Lythrum salicaria* | Purple-loosestrife |
| 0920 1454 | *Phalaris arundinacea* | Reed Canary-grass |
| 0920 1745 | *Rumex hydrolapathum* | Water dock |
| 0920 1046 | *Isolepis cernua* | Slender club-rush |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 677 | *Eleocharis quinqueflora* | Few-flowered spike-rush |
| 0920 1561 | *Potamogeton coloratus* | Fen pondweed |
| 0910 718 | *Equisetum pratense* | Shady horsetail |
| 0920 1331 | *Myriophyllum spicatum* | Spiked water-milfoil |
| 0920 833 | *Filipendula ulmaria* | Meadowsweet |
| 0920 1982 | *Sparganium natans* | Least bur-reed |
| 0920 1177 | *Lobelia dortmanna* | Water lobelia |
| 0920 1521 | *Persicaria amphibia* | Amphibious bistort |
| 0920 1047 | *Isolepis setacea* | Bristle club-rush |
| 0920 1654 | *Ranunculus omiophyllus* | Round-leaved crowfoot |
| 0920 739 | *Eriocaulon aquaticum* | Pipewort |
| 0920 1225 | *Lysimachia vulgaris* | Yellow loosestrife |
| 0920 977 | *Hierochloe odorata* | Holy-grass |
| 0920 999 | *Hydrocotyle vulgaris* | Marsh pennywort |
| 0920 629 | *Deschampsia setacea* | Bog hair-grass |
| 0920 302 | *Callitriche hermaphroditica* | Autumnal water-starwort |
| 0920 471 | *Ceratophyllum demersum* | Rigid hornwort |
| 0920 388 | *Carex limosa* | Bog-sedge |
| 0920 1996 | *Spiranthes romanzoffiana* | Irish lady's-tresses |
| 0920 510 | *Cicuta virosa* | Cowbane |
| 0920 1567 | *Potamogeton friesii* | Flat-stalked pondweed |
| 0920 2139 | *Valeriana dioica* | Marsh valerian |
| 0920 63 | *Alisma plantago-aquatica* | Water-plantain |
| 0920 1076 | *Juncus subnodulosus* | Blunt-flowered rush |
| 0920 2110 | *Typha angustifolia* | Lesser bulrush |
| 0920 310 | *Caltha palustris* | Marsh-marigold |
| 0920 370 | *Carex echinata* | Star sedge |
| 0910 717 | *Equisetum palustre* | Marsh horsetail |
| 0920 1063 | *Juncus conglomeratus* | Compact rush |
| 0920 1358 | *Nymphaea alba* | White water-lily |
| 0920 1334 | *Najas flexilis* | Slender naiad |
| 0920 1356 | *Nuphar lutea* | Yellow water-lily |
| 0920 1465 | *Phragmites australis* | Common reed |
| 0920 1852 | *Schoenoplectus tabernaemontani* | Grey club-rush |
| 0920 882 | *Galium palustre* | Common marsh-bedstraw |
| 0920 82 | *Alopecurus geniculatus* | Marsh foxtail |
| 0920 1350 | *Lysimachia thyrsiflora* | Tufted loosestrife |
| 0920 1947 | *Solanum dulcamara* | Bittersweet |
| 0920 2167 | *Veronica catenata* | Pink water-speedwell |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1592 | *Potentilla palustris* | Marsh cinquefoil |
| 0920 109 | *Angelica sylvestris* | Wild angelica |
| 0920 396 | *Carex otrubae* | False fox-sedge |
| 0920 1323 | *Myosotis secunda* | Creeping forget-me-not |
| 0920 1663 | *Ranunculus sceleratus* | Celery-leaved buttercup |
| 0920 1534 | *Persicaria minor* | Small water-pepper |
| 0920 135 | *Apium inundatum* | Lesser marshwort |
| 0920 1070 | *Juncus inflexus* | Hard rush |
| 0920 1653 | *Ranunculus hederaceus* | Ivy-leaved crowfoot |
| 0920 1651 | *Ranunculus flammula* | Lesser spearwort |
| 0920 1057 | *Juncus bufonius* sens.lat. | |
| 0920 2163 | *Veronica anagallis-aquatica* | Blue water-speedwell |
| 0920 523 | *Cladium mariscus* | Great fen-sedge |
| 0920 1318 | *Myosotis stolonifera* | Pale forget-me-not |
| 0920 1566 | *Potamogeton filiformis* | Slender-leaved pondweed |
| 0920 2130 | *Utricularia minor* | Lesser bladderwort |
| 0920 1655 | *Ranunculus lingua* | Greater spearwort |
| 0920 981 | *Hippuris vulgaris* | Mare's-tail |
| 0920 1577 | *Potamogeton praelongus* | Long-stalked pondweed |
| 0920 1289 | *Menyanthes trifoliata* | Bogbean |
| 0920 1652 | *Ranunculus fluitans* | River water-crowfoot |
| 0920 234 | *Berula erecta* | Lesser water-parsnip |
| 0920 740 | *Eriophorum angustifolium* | Common cottongrass |
| 0920 2179 | *Veronica scutellata* | Marsh speedwell |
| 0920 343 | *Carex aquatilis* | Water sedge |
| 0920 424 | *Carex vesicaria* | Bladder-sedge |
| 0920 2129 | *Utricularia intermedia* sens.lat. | |
| 0920 413 | *Carex riparia* | Greater pond-sedge |
| 0920 1357 | *Nuphar pumila* | Least water-lily |
| 0920 2237 | *Zannichellia palustris* | Horned pondweed |
| 0920 1444 | *Lythrum portula* | Water-purslane |
| 0910 1043 | *Isoetes echinospora* | Spring quillwort |
| 0920 341 | *Carex acutiformis* | Lesser pond-sedge |
| 0920 678 | *Eleocharis uniglumis* | Slender spike-rush |
| 0920 1312 | *Montia fontana* | Blinks |
| 0920 1981 | *Sparganium erectum* | Branched bur-reed |
| 0920 2102 | *Triglochin palustre* | Marsh arrowgrass |
| 0920 673 | *Eleocharis acicularis* | Needle spike-rush |
| 0920 414 | *Carex rostrata* | Bottle sedge |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 679 | *Eleogiton fluitans* | Floating club-rush |
| 0920 936 | *Glyceria notata* | Plicate sweet-grass |
| 0920 2020 | *Subularia aquatica* | Awlwort |
| 0920 934 | *Glyceria maxima* | Reed sweet-grass |
| 0920 1128 | *Lemna trisulca* | Ivy-leaved duckweed |
| 0920 1578 | *Potamogeton pusillus* | Lesser pondweed |
| 0920 2215 | *Viola palustris* | Marsh violet |
| 0920 401 | *Carex paniculata* | Greater tussock-sedge |
| 0920 1050 | *Juncus acutiflorus* | Sharp-flowered rush |
| 0920 1568 | *Potamogeton gramineus* | Various-leaved pondweed |
| 0920 386 | *Carex lasiocarpa* | Slender sedge |
| 0920 1983 | *Sparganium emersum* | Unbranched bur-reed |
| 0910 713 | *Equisetum fluviatile* | Water horsetail |
| 0920 1175 | *Littorella uniflora* | Shoreweed |
| 0920 1058 | *Juncus bulbosus* | Bulbous rush |
| 0920 7117 | *Carex viridula* | Yellow-sedge |
| 0920 671 | *Elatine hexandra* | Six-stamened waterwort |
| 0920 1851 | *Schoenoplectus lacustris* | Common club-rush |
| 0910 1045 | *Isoetes lacustris* | Quillwort |
| 0920 1067 | *Juncus effusus* | Soft-rush |
| 0920 1319 | *Myosotis laxa* | Tufted forget-me-not |
| 0920 1558 | *Potamogeton alpinus* | Red pondweed |
| 0920 675 | *Eleocharis palustris* | Common spike-rush |
| 0920 1126 | *Lemna minor* | Common duckweed |
| 0920 933 | *Glyceria fluitans* | Floating sweet-grass |
| 0920 400 | *Carex panicea* | Carnation sedge |
| 0920 307 | *Callitriche stagnalis* sens.lat. | |
| 0920 1054 | *Juncus articulatus* | Jointed rush |
| 0920 2132 | *Utricularia vulgaris* sens.lat. | |
| 0920 393 | *Carex nigra* | Common sedge |
| 0920 1573 | *Potamogeton obtusifolius* | Blunt-leaved pondweed |
| 0920 2111 | *Typha latifolia* | Bulrush |
| 0920 932 | *Glyceria declinata* | Small sweet-grass |
| 0920 1330 | *Myriophyllum alterniflorum* | Alternate water-milfoil |
| 0920 1559 | *Potamogeton berchtoldii* | Small pondweed |
| 0920 1980 | *Sparganium angustifolium* | Floating bur-reed |
| 0920 303 | *Callitriche hamulata* sens.lat. | |
| 0920 39 | *Agrostis stolonifera* | Creeping bent |
| 0920 62 | *Alisma lanceolatum* | Narrow-leaved water-plantain |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| | *Althaea officinalis* | Marsh-mallow |
| 0920 2646 | *Calamagrostis purpurea* | Scandinavian small-reed |
| 0920 295 | *Calamagrostis scotica* | Scottish small-reed |
| | *Callitriche brutia* | Pedunculate water-starwort |
| | *Callitriche hamulata* | Intermediate water-starwort |
| 0920 304 | *Callitriche obtusangula* | Blunt-fruited water-starwort |
| 0920 2289 | *Callitriche palustris* | |
| 0920 307.1 | *Callitriche platycarpa* | Various-leaved water-starwort |
| 0920 307.2 | *Callitriche stagnalis* | Common water-starwort |
| 0920 330 | *Cardamine impatiens* | Narrow-leaved bitter-cress |
| 0920 342 | *Carex appropinquata* | Fibrous tussock-sedge |
| 0920 352 | *Carex buxbaumii* | Club sedge |
| 0920 356 | *Carex chordorrhiza* | String sedge |
| 0920 368 | *Carex divisa* | Divided sedge |
| 0920 372 | *Carex elongata* | Elongated sedge |
| 0920 411 | *Carex recta* | Estuarine sedge |
| 0920 566 | *Crassula aquatica* | Pigmyweed |
| 0920 672 | *Elatine hydropiper* | Eight-stamened waterwort |
| 0920 2267 | *Eleocharis austriaca* | Northern spike-rush |
| 0920 676 | *Eleocharis parvula* | Dwarf spike-rush |
| 0920 905 | *Gentianella uliginosa* | Dune gentian |
| 0920 944 | *Groenlandia densa* | Opposite-leaved pondweed |
| 0920 995 | *Hottonia palustris* | Water-violet |
| 0920 2291 | *Hydrilla verticillata* | Hydrilla |
| 0920 1057.2 | *Juncus bufonius* | Toad rush |
| 0920 1068 | *Juncus filiformis* | Thread rush |
| 0920 1115 | *Lathyrus palustris* | Marsh pea |
| 0920 1125 | *Lemna gibba* | Fat duckweed |
| 0920 1155 | *Limosella aquatica* | Mudwort |
| | *Mentha pulegium* | Pennyroyal |
| | *Myosoton aquaticum* | Water chickweed |
| 0920 1362 | *Oenanthe aquatica* | Fine-leaved water-dropwort |
| 0920 1562 | *Potamogeton compressus* | Grass-wrack pondweed |
| 0920 1563 | *Potamogeton crispus* | Curled pondweed |
| 0920 1565 | *Potamogeton epihydrus* | American pondweed |
| 0920 1570 | *Potamogeton natans* | Broad-leaved pondweed |
| 0920 1574 | *Potamogeton pectinatus* | Fennel pondweed |
| 0920 1575 | *Potamogeton perfoliatus* | Perfoliate pondweed |
| 0920 1576 | *Potamogeton polygonifolius* | Bog pondweed |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1581 | *Potamogeton trichoides* | Hairlike pondweed |
| 0920 1643.1 | *Ranunculus aquatilis* | Common water-crowfoot |
| 0920 1643.2 | *Ranunculus peltatus* | Pond water-crowfoot |
| 0920 1643.3 | *Ranunculus penicillatus* | Stream water-crowfoot |
| | *Ranunculus penicillatus* subsp.*pseudofluitans* | Stream water-crowfoot |
| 0920 1661 | *Ranunculus reptans* | Creeping spearwort |
| 0920 1692 | *Rhynchospora fusca* | Brown beak-sedge |
| 0920 2546 | *Rorippa islandica* sens.str. | Northern yellow-cress |
| 0920 1346 | *Rorippa microphylla* | Narrow-fruited water-cress |
| 0920 1739 | *Rumex aquaticus* | Scottish dock |
| 0920 1747 | *Rumex maritimus* | Golden dock |
| 0920 1832 | *Saxifraga hirculus* | Marsh saxifrage |
| 0920 1848 | *Scheuchzeria palustris* | Rannoch-rush |
| 0920 1854 | *Schoenus ferrugineus* | Brown bog-rush |
| 0920 1944 | *Sium latifolium* | Greater water-parsnip |
| 0910 2052 | *Thelypteris palustris* | Marsh fern |
| 0910 2075 | *Trichomanes speciosum* | Killarney fern |
| 0920 2131 | *Utricularia australis* | Bladderwort |
| 0920 1282 | *Mentha suaveolens* | Round-leaved mint |
| 0920 1197 | *Lupinus nootkatensis* | Nootka lupin |
| 0920 1505 | *Poa palustris* | Swamp meadow-grass |
| 0920 1298 | *Mimulus* | |
| 0920 1804 | *Salix triandra* | Almond willow |
| 0920 108 | *Angelica archangelica* | Garden angelica |
| 0920 1040 | *Iris versicolor* | Purple iris |
| 0920 1897 | *Senecio fluviatilis* | Broad-leaved ragwort |
| 0920 288 | *Butomus umbellatus* | Flowering-rush |
| 0920 15 | *Acorus calamus* | Sweet-flag |
| 0920 966 | *Heracleum mantegazzianum* | Giant hogweed |
| 0920 1026 | *Impatiens glandulifera* | Indian balsam |
| 0920 681 | *Elodea canadensis* | Canadian waterweed |
| | *Acaena inermis* | Spineless acaena |
| | *Aconitum napellus* | Monk's-hood |
| | *Alchemilla mollis* | Garden lady's-mantle |
| | *Alyssum saxatile* | Golden alison |
| | *Aponogeton distachyos* | Cape pondweed |
| | *Azolla filiculoides* | Water fern |
| | *Cabomba caroliniana* | Fanwort |
| | *Caldesia parnassiifolia* | Parnassus-leaved water-plantian |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| | *Calla palustris* | Bog arum |
| | *Campanula rhomboidalis* | Broad-leaved harebell |
| | *Cardamine raphanifolia* | Greater cuckooflower |
| | *Carex pseudocyperus* | Cyperus sedge |
| | *Cirsium oleraceum* | Cabbage thistle |
| | *Cotoneaster hjelmqvistii* | Hjelmqvist's cotoneaster |
| | *Crassula helmsii* | New Zealand pygmyweed/ Australian swamp stonecrop |
| | *Crocosmia pottsii* | Pott's montbretia |
| | *Crocus biflorus* | Silvery crocus |
| | *Dicentra formosa* | Bleeding-heart |
| | *Elodea nuttallii* | Nuttall's Waterweed |
| | *Ficus carica* | Fig |
| | *Filipendula kamtschatica* | Giant meadowsweet |
| | *Gentiana asclepiadea* | Willow gentian |
| | *Grindelia robusta* | Californian gunweed |
| | *Gunnera tinctoria* | Giant-rhubarb |
| 0920 987 | *Homogyne alpina* | Purple colt's-foot |
| | *Hydrocharis morsus-ranae* | Frogbit |
| | *Iris chrysographes* | |
| | *Lagarosiphon major* | Curly water-thyme |
| | *Lemna minuta* | Least duckweed |
| | *Lupinus nootkatensis x polyphyllus (L. x pseudopolyphyllus)* | |
| | *Luronium natans* | Floating water-plantain |
| | *Lysichiton americanus* | American skunk-cabbage |
| | *Mentha aquatica x spicata (M. x piperita)* | Peppermint |
| | *Mentha x smithiana (M. aquatica x arvensis x spicata)* | Tall mint |
| | *Mimulus cupreus x guttatus (M. x burnetii)* | Coppery monkeyflower |
| | *Mimulus cupreus x luteus (M. x maculosus)* | Scottish monkey-flower |
| | *Mimulus guttatus* | Monkeyflower |
| | *Mimulus guttatus x luteus (M. x robertsii)* | Hybrid monkeyflower |
| | *Mimulus luteus* | Blood-drop emlets |
| | *Mimulus moschatus* | Musk |
| | *Montia parvifolia* | Small-leaved blinks |
| | *Myriophyllum aquaticum* | Parrot's feather |
| | *Nuphar advena* | Spatter-dock |
| | *Nymphoides peltata* | Fringed water-lily |
| | *Persicaria alpina* | Alpine knotweed |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| | *Persicaria campanulata* | Lesser knotweed |
| | *Petasites japonicus* | Giant butterbur |
| | *Primula bulleyana* | |
| | *Primula florindae* | Tibetan cowslip |
| | *Ribes odoratum* | Buffalo currant |
| | *Rodgersia podophylla* | Rodgersia |
| | *Rorippa amphibia* | Great yellow-cress |
| | *Rosa glauca* | Red-leaved rose |
| | *Rosa palustris* | Swamp rose |
| | *Rudbeckia laciniata* | Coneflower |
| | *Sagittaria sagittifolia* | Arrow-head |
| | *Sagittaria subulata* | Narrow-leaved arrowhead |
| | *Sanguisorba canadensis* | White burnet |
| | *Saxifraga rotundifolia* | Round-leaved saxifrage |
| | *Senecio doria* | Golden ragwort |
| | *Senecio doronicum* | Chamois ragwort |
| | *Sinacalia tangutica* | Chinese ragwort |
| | *Spiraea chamaedryfolia* | Elm-leaved spiraea |
| | *Spirodela polyrhiza* | Greater duckweed |
| | *Stratiotes aloides* | Water soldier |
| | *Telekia speciosa* | Yellow oxeye |
| | *Teucrium scordium* | Water germander |
| 0920 268 | *Bromus lepidus* | Slender soft-brome |
| 0920 118 | *Anthemis cotula* | Stinking chamomile |
| 0920 771 | *Euphorbia exigua* | Dwarf spurge |
| 0920 1185 | *Lolium temulentum* | |
| 0920 504 | *Chrysanthemum segetum* | Corn marigold |
| 0920 612 | *Dactylorhiza praetermissa* | Southern marsh-orchid |
| 0920 278 | *Lithospermum arvense* | Field gromwell |
| 0920 1182 | *Lolium multiflorum* | Italian rye-grass |
| 0920 509 | *Cichorium intybus* | Chicory |
| 0920 430 | *Carum carvi* | Caraway |
| 0920 1261 | *Silene noctiflora* | Night-flowering catchfly |
| 0920 262 | *Bromus commutatus* | Meadow brome |
| 0920 940 | *Gnaphalium sylvaticum* | Heath cudweed |
| 0920 1847 | *Scandix pecten-veneris* | Shepherd's-needle |
| 0920 1670 | *Rapistrum rugosum* | Bastard cabbage |
| 0920 1987 | *Spergula arvensis* | Corn spurrey |
| 0920 1912 | *Sherardia arvensis* | Field madder |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1290 | *Mercurialis annua* | Annual mercury |
| 0920 1933 | *Sinapis arvensis* | Charlock |
| 0920 1862 | *Scleranthus annuus* | Annual knawel |
| 0920 5481 | *Raphanus raphanistrum* | Wild radish |
| 0920 498 | *Chenopodium urbicum* | Upright goosefoot |
| 0920 2220 | *Viola tricolor* | Wild pansy |
| 0920 1103 | *Lamium purpureum* | Red dead-nettle |
| 0920 1932 | *Sinapis alba* | White mustard |
| 0920 867 | *Galeopsis speciosa* | Large-flowered hemp-nettle |
| 0920 222 | *Avena strigosa* | Bristle oat |
| 0920 320 | *Campanula rapunculoides* | Creeping bellflower |
| 0920 589 | *Cuscuta epithymum* | Dodder |
| 0920 502 | *Leucanthemum vulgare* | Oxeye daisy |
| 0920 1273 | *Mentha arvensis* | Corn mint |
| 0920 273 | *Bromus secalinus* | Rye brome |
| 0920 913 | *Geranium phaeum* | Dusky crane's-bill |
| 0920 321 | *Campanula rapunculus* | Rampion bellflower |
| 0920 2217 | *Viola reichenbachiana* | Early dog-violet |
| 0920 1455 | *Phalaris canariensis* | Canary-grass |
| 0920 1492 | *Platanthera bifolia* | Lesser butterfly-orchid |
| 0920 2001 | *Stachys arvensis* | Field woundwort |
| 0920 2243 | *Euphrasia officinalis* agg. | |
| 0920 117 | *Anthemis arvensis* | Corn chamomile |
| 0920 1527 | *Fallopia convolvulus* | Black-bindweed |
| 0920 1132 | *Leonurus cardiaca* | Motherwort |
| 0920 1186 | *Lonicera caprifolium* | Perfoliate honeysuckle |
| 0920 1493 | *Platanthera chlorantha* | Greater butterfly-orchid |
| 0920 517 | *Cirsium eriophorum* | Woolly thistle |
| 0920 778 | *Euphorbia villosa* | Hairy spurge |
| 0920 868 | *Galeopsis tetrahit* agg. | |
| 0920 4578 | *Silene vulgaris* | Bladder campion |
| 0920 325 | *Capsella bursa-pastoris* | Shepherd's-purse |
| 0920 830 | *Filago vulgaris* | Common cudweed |
| 0920 1174 | *Lithospermum officinale* | Common Gromwell |
| 0920 1741 | *Rumex conglomeratus* | Clustered dock |
| 0920 2161 | *Veronica agrestis* | Green field-speedwell |
| 0920 484 | *Chenopodium bonus-henricus* | Good-King-Henry |
| 0920 1144 | *Ligustrum vulgare* | Wild privet |
| 0920 2013 | *Stellaria neglecta* | Greater chickweed |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1813 | *Salvia verticillata* | Whorled clary |
| 0920 1905 | *Senecio vulgaris* | Groundsel |
| 0920 313 | *Calystegia silvatica* | Large bindweed |
| 0920 440 | *Centaurea cyanus* | Cornflower |
| 0920 2033 | *Tanacetum vulgare* | Tansy |
| 0920 1644 | *Ranunculus arvensis* | Corn buttercup |
| 0920 1424 | *Papaver argemone* | Prickly poppy |
| 0920 1515 | *Polygala vulgaris* | Common milkwort |
| 0920 480 | *Chelidonium majus* | Greater celandine |
| 0920 1257 | *Melampyrum sylvaticum* | Small cow-wheat |
| 0920 772 | *Euphorbia helioscopia* | Sun spurge |
| 0920 1537 | *Persicaria maculosa* | Redshank |
| 0920 389 | *Carex maritima* | Curved sedge |
| 0920 1099 | *Lamium amplexicaule* | Henbit dead-nettle |
| 0920 964 | *Helleborus viridis* | Green hellebore |
| 0920 1266 | *Melilotus indicus* | Small melilot |
| 0920 901 | *Gentianella campestris* | Field gentian |
| 0920 1814 | *Sambucus ebulus* | Dwarf elder |
| 0920 271 | *Bromus racemosus* | Smooth brome |
| 0920 1490 | *Plantago media* | Hoary plantain |
| 0920 239 | *Betula pendula* | Silver birch |
| 0920 2242 | *Salicornia* | |
| 0910 1001 | *Hymenophyllum wilsonii* | Wilson's filmy-fern |
| 0920 12 | *Clinopodium acinos* | Basil thyme |
| 0920 1930 | *Silybum marianum* | Milk thistle |
| 0920 2196 | *Vicia orobus* | Wood bitter-vetch |
| 0920 162 | *Arenaria serpyllifolia* | Thyme-leaved sandwort |
| 0920 1768 | *Sagina saginoides* | Alpine pearlwort |
| 0920 611 | *Dactylorhiza majalis* | Western marsh-orchid |
| 0920 1002 | *Hyoscyamus niger* | Henbane |
| 0920 269 | *Bromus hordeaceus* | Soft-brome |
| 0920 1630 | *Pyrola media* | Intermediate wintergreen |
| 0920 1218 | *Anchusa arvensis* | Bugloss |
| 0920 651 | *Draba incana* | Hoary whitlowgrass |
| 0920 911 | *Geranium molle* | Dove's-foot crane's-bill |
| 0920 1130 | *Leontodon hispidus* | Rough hawkbit |
| 0920 1416 | *Oxalis stricta* | Upright yellow-sorrel |
| 0920 2128 | *Urtica urens* | Small nettle |
| 0920 99 | *Anagallis arvensis* | Scarlet pimpernel |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 532 | *Cochlearia anglica* | Common scurvygrass |
| 0920 947 | *Pseudorchis albida* | Small-white orchid |
| 0920 2122 | *Ulmus procera* | English elm |
| 0920 1084 | *Knautia arvensis* | Field scabious |
| 0920 2065 | *Tilia cordata x platyphyllos (T. x europaea)* | |
| 0920 131 | *Aphanes arvensis* agg. | |
| 0920 488 | *Chenopodium glaucum* | Oak-leaved goosefoot |
| 0920 491 | *Chenopodium murale* | Nettle-leaved goosefoot |
| 0920 758 | *Eryngium maritimum* | Sea-holly |
| 0920 1683 | *Rhinanthus angustifolius* | Greater yellow-rattle |
| 0920 5474 | *Daucus carota* | Wild carrot |
| 0920 1164 | *Linaria vulgaris* | Common toadflax |
| 0920 116 | *Antennaria dioica* | Mountain everlasting |
| 0920 831 | *Filago minima* | Small cudweed |
| 0920 1835 | *Saxifraga hypnoides* | Mossy saxifrage |
| 0920 2210 | *Viola hirta* | Hairy violet |
| 0920 481 | *Chenopodium album* agg. | |
| 0920 2175 | *Veronica persica* | Common field-speedwell |
| 0920 1942 | *Sisyrinchium bermudiana* | Blue-eyed-grass |
| 0920 2106 | *Trollius europaeus* | Globeflower |
| 0920 2119 | *Ulmus glabra* | Wych elm |
| 0920 1480 | *Pinguicula lusitanica* | Pale butterwort |
| 0920 5441 | *Salsola kali* | Prickly saltwort |
| 0920 1729 | *Rubus idaeus* | Raspberry |
| 0920 821 | *Festuca ovina* agg. | |
| 0920 1875 | *Sedum acre* | Biting stonecrop |
| 0920 1594 | *Potentilla reptans* | Creeping cinquefoil |
| 0920 2206 | *Viola arvensis* | Field pansy |
| 0920 1112 | *Lathyrus linifolius* | Bitter-vetch |
| 0920 976 | *Pilosella officinarum* | Mouse-ear-hawkweed |
| 0920 1258 | *Silene latifolia* | White campion |
| 0920 1815 | *Sambucus nigra* | Elder |
| 0920 2199 | *Vicia sylvatica* | Wood vetch |
| 0920 1201 | *Luzula campestris* | Field wood-rush |
| 0920 68 | *Allium oleraceum* | Field garlic |
| 0920 841 | *Fraxinus excelsior* | Ash |
| 0920 22 | *Agrimonia eupatoria* | Agrimony |
| 0920 544 | *Convolvulus arvensis* | Field bindweed |
| 0920 1414 | *Oxalis corniculata* | Procumbent yellow-sorrel |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1484 | *Pinus sylvestris* | Scots pine |
| 0920 5459 | *Trifolium hybridum* | Alsike clover |
| 0920 460 | *Cerastium alpinum* | Alpine mouse-ear |
| 0920 838 | *Fragaria vesca* | Wild strawberry |
| 0920 1387 | *Orchis mascula* | Early-purple orchid |
| 0920 1420 | *Oxyria digyna* | Mountain sorrel |
| 0920 552 | *Coronopus squamatus* | Swine-cress |
| 0920 769 | *Euphorbia esula* agg. | |
| 0920 891 | *Genista anglica* | Petty whin |
| 0920 952 | *Hedera helix* | Common ivy |
| 0920 1516 | *Polygonatum multiflorum* | Solomon's-seal |
| 0920 569 | *Crataegus monogyna* | Hawthorn |
| 0920 1328 | *Myrica gale* | Bog-myrtle |
| 0920 1522 | *Polygonum aviculare* agg. | |
| 0920 146 | *Arabis hirsuta* | Hairy rock-cress |
| 0920 157 | *Arenaria balearica* | Mossy sandwort |
| 0920 175 | *Artemisia vulgaris* | Mugwort |
| 0920 218 | *Atriplex patula* | Common orache |
| 0920 598 | *Cynosurus echinatus* | Rough dog's-tail |
| 0920 668 | *Echinochloa crus-galli* | Cockspur |
| 0920 924 | *Geum rivale* | Water avens |
| 0920 1108 | *Lathyrus aphaca* | Yellow vetchling |
| 0920 2087 | *Trifolium medium* | Zigzag clover |
| 0920 2230 | *Wahlenbergia hederacea* | Ivy-leaved bellflower |
| 0920 698 | *Epilobium parviflorum* | Hoary willowherb |
| 0920 939 | *Gnaphalium supinum* | Dwarf cudweed |
| 0920 2173 | *Veronica officinalis* | Heath speedwell |
| 0920 906 | *Geranium columbinum* | Long-stalked crane's-bill |
| 0920 948 | *Gymnadenia conopsea* | Fragrant orchid |
| 0910 1547 | *Polystichum lonchitis* | Holly-fern |
| 0920 1796 | *Salix lapponum* | Downy willow |
| 0920 810 | *Fagus sylvatica* | Beech |
| 0920 1033 | *Inula helenium* | Elecampane |
| 0920 2176 | *Veronica polita* | Grey field-speedwell |
| 0920 20 | *Aegopodium podagraria* | Ground elder |
| 0920 476 | *Chaerophyllum temulum* | Rough chervil |
| 0920 501 | *Minuartia sedoides* | Cyphel |
| 0920 427 | *Carlina vulgaris* | Carline thistle |
| 0920 1208 | *Luzula spicata* | Spiked wood rush |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1242 | *Matricaria discoidea* | Pineappleweed |
| 0920 571 | *Crepis biennis* | Rough hawk's-beard |
| 0920 1238 | *Marrubium vulgare* | White horehound |
| 0920 691 | *Epilobium anagallidifolium* | Alpine willowherb |
| 0920 1613 | *Prunus cerasus* | Dwarf cherry |
| 0920 1766 | *Sagina nodosa* | Knotted pearlwort |
| 0920 1913 | *Sibbaldia procumbens* | |
| 0920 654 | *Drosera anglica* | Great sundew |
| 0920 1098 | *Lamium album* | White dead nettle |
| 0920 1954 | *Sonchus oleraceus* | Smooth sow thistle |
| 0920 503 | *Tanacetum parthenium* | Feverfew |
| 0920 48 | *Alchemilla alpina* | Alpine lady's-mantle |
| 0910 720 | *Equisetum sylvaticum* | Wood horsetail |
| 0920 1317 | *Myosotis arvensis* | Field forget-me-not |
| 0920 2019 | *Suaeda maritima* | Annual seablite |
| 0920 130 | *Apera spica-venti* | Loose silky-bent |
| 0920 1133 | *Lepidium campestre* | Field pepperwort |
| 0920 1249 | *Medicago polymorpha* | Toothed medick |
| 0920 1908 | *Sesleria caerulea* | Blue Moor-grass |
| 0920 41 | *Aira caryophyllea* | Silver hair-grass |
| 0920 170 | *Artemisia absinthium* | Wormwood |
| 0920 204 | *Aster tripolium* | Sea aster |
| 0920 1062 | *Juncus compressus* | Round-fruited rush |
| 0920 1437 | *Parnassia palustris* | Grass of Parnassus |
| 0920 155 | *Arctostaphylos uva-ursi* | Bearberry |
| 0920 1048 | *Jasione montana* | Sheep's-bit |
| 0920 77 | *Alnus glutinosa* | Alder |
| 0920 1259 | *Silene dioica* | Red campion |
| 0920 446 | *Centaurea scabiosa* | Greater Knapweed |
| 0920 847 | *Fumaria capreolata* | White ramping fumitory |
| 0910 1619 | *Pteridium aquilinum* | Bracken |
| 0920 151 | *Arctium lappa* | Greater burdock |
| 0920 916 | *Geranium pusillum* | Small-flowered crane's-bill |
| 0920 993 | *Hordeum secalinum* | Meadow barley |
| 0920 925 | *Geum urbanum* | Wood avens |
| 0920 1640 | *Quercus robur* | Pedunculate oak |
| 0920 540 | *Conium maculatum* | Hemlock |
| 0910 603 | *Cystopteris fragilis* | Brittle bladder-fern |
| 0920 183 | *Galium odoratum* | Woodruff |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1842 | *Saxifraga stellaris* | Starry saxifrage |
| 0920 550 | *Securigera varia* | Crown vetch |
| 0920 34 | *Agrostemma githago* | Corncockle |
| 0920 100 | *Anagallis tenella* | Bog pimpernel |
| 0920 332 | *Arabis petraea* | Northern rock-cress |
| 0920 579 | *Crithmum maritimum* | Rock samphire |
| 0920 768 | *Euphorbia dulcis* | Sweet spurge |
| 0920 1543 | *Persicaria vivipara* | Alpine bistort |
| 0920 1647 | *Ranunculus bulbosus* | Bulbous buttercup |
| 0920 1826 | *Saxifraga aizoides* | Yellow saxifrage |
| 0920 1361 | *Odontites vernus* | Red bartsia |
| 0920 2168 | *Veronica chamaedrys* | Germander speedwell |
| 0920 84 | *Alopecurus myosuroides* | Black-grass |
| 0920 322 | *Campanula rotundifolia* | Harebell |
| 0920 339 | *Carduus tenuiflorus* | Slender thistle |
| 0920 543 | *Convallaria majalis* | Lily-of-the-valley |
| 0920 695 | *Epilobium montanum* | Broad-leaved willowherb |
| 0920 931 | *Glechoma hederacea* | Ground ivy |
| 0920 1256 | *Melampyrum pratense* | Common cow-wheat |
| 0920 1442 | *Pedicularis sylvatica* | Lousewort |
| 0920 1735 | *Rumex acetosella* | Sheep's sorrel |
| 0920 2046 | *Teucrium scorodonia* | Wood sage |
| 0920 2109 | *Tussilago farfara* | Colt's-foot |
| 0920 315 | *Campanula glomerata* | Clustered bellflower |
| 0920 537 | *Coeloglossum viride* | Frog orchid |
| 0920 687 | *Hyacinthoides non-scripta* | Bluebell |
| 0920 1726 | *Rubus caesius* | Dewberry |
| 0920 572 | *Crepis capillaris* | Smooth hawk's-beard |
| 0910 1217 | *Huperzia selago* | Fir clubmoss |
| 0920 1377 | *Ononis repens* | Common restharrow |
| 0920 461 | *Cerastium arvense* | Field mouse-ear |
| 0920 1250 | *Medicago lupulina* | Black medick |
| 0920 1447 | *Petasites hybridus* | Butterbur |
| 0920 1798 | *Salix myrsinites* | Whortle-leaved willow |
| 0920 2091 | *Trifolium pratense* | Red clover |
| 0920 2212 | *Viola lutea* | Mountain pansy |
| 0920 402 | *Carex pauciflora* | Few-flowered sedge |
| 0910 1000 | *Hymenophyllum tunbrigense* | Tunbridge filmy-fern |
| 0920 1436 | *Paris quadrifolia* | Herb-Paris |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1836 | *Saxifraga nivalis* | Alpine saxifrage |
| 0920 1855 | *Schoenus nigricans* | Black bog-rush |
| 0920 1918 | *Silene gallica* | Small-flowered catchfly |
| 0920 9 | *Achillea ptarmica* | Sneezewort |
| 0920 219 | *Atropa belladonna* | Deadly nightshade |
| 0920 1805 | *Salix viminalis* | Osier |
| 0920 2041 | *Teesdalia nudicaulis* | Shepherd's cress |
| 0920 2198 | *Vicia sepium* | Bush vetch |
| 0920 21 | *Aethusa cynapium* | Fool's parsley |
| 0920 1501 | *Poa glauca* | Glaucous meadow-grass |
| 0920 1585 | *Potentilla argentea* | Hoary cinquefoil |
| 0920 888 | *Galium verum* | Lady's bedstraw |
| 0920 988 | *Honckenya peploides* | Sea sandwort |
| 0920 1265 | *Melilotus altissimus* | Tall melilot |
| 0920 1018 | *Hypochaeris glabra* | Smooth cat's-ear |
| 0920 1291 | *Mercurialis perennis* | Dog's mercury |
| 0920 2015 | *Stellaria palustris* | Marsh stitchwort |
| 0920 2214 | *Viola odorata* | Sweet violet |
| 0910 1213 | *Diphasiastrum alpinum* | Alpine clubmoss |
| 0920 897 | *Gentianella amarella* | Autumn gentian |
| 0920 1179 | *Lobularia maritima* | Sweet Alison |
| 0920 1180 | *Loiseleuria procumbens* | Trailing azalea |
| 0920 1321 | *Myosotis discolor* | Changing forget-me-not |
| 0920 105 | *Anemone nemorosa* | Wood anemone |
| 0920 1183 | *Lolium perenne* | Perennial rye-grass |
| 0920 1199 | *Luzula arcuata* | Curved wood-rush |
| 0920 1292 | *Mertensia maritima* | Oysterplant |
| 0920 1460 | *Phleum alpinum* | Alpine cat's-tail |
| 0920 2247 | *Phleum pratense* sens.lat. | |
| 0920 1597 | *Potentilla neumanniana* | Spring cinquefoil |
| 0920 1678 | *Rhinanthus minor* | Yellow-rattle |
| 0920 1837 | *Saxifraga oppositifolia* | Purple saxifrage |
| 0920 557 | *Corylus avellana* | Hazel |
| 0920 907 | *Geranium dissectum* | Cut-leaved crane's-bill |
| 0920 1316 | *Myosotis alpestris* | Alpine forget-me-not |
| 0920 1441 | *Pedicularis palustris* | Marsh lousewort |
| 0920 1896 | *Senecio erucifolius* | Hoary ragwort |
| 0920 1951 | *Solidago virgaurea* | Goldenrod |
| 0920 246 | *Blysmus rufus* | Saltmarsh flat-sedge |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 745 | *Erodium cicutarium* agg. | |
| 0920 1843 | *Saxifraga tridactylites* | Rue-leaved saxifrage |
| 0920 1399 | *Orobanche alba* | Thyme broomrape |
| 0920 1882 | *Sedum rosea* | Roseroot |
| 0920 1885 | *Sedum telephium* | Orpine |
| 0920 2069 | *Torilis japonica* | Upright hedge-parsley |
| 0920 2405 | *Arctium minus* | Lesser burdock |
| 0920 541 | *Conopodium majus* | Pignut |
| 0920 874 | *Galium boreale* | Northern bedstraw |
| 0920 1079 | *Juncus triglumis* | Three-flowered rush |
| 0920 1939 | *Sisymbrium orientale* | Eastern rocket |
| 0920 2080 | *Trifolium campestre* | Hop trefoil |
| 0920 5 | *Acer pseudoplatanus* | Sycamore |
| 0920 1061 | *Juncus castaneus* | Chestnut rush |
| 0920 474 | *Chaenorhinum minus* | Small toadflax |
| 0920 1825 | *Saussurea alpina* | Alpine saw-wort |
| 0920 85 | *Alopecurus pratensis* | Meadow foxtail |
| 0920 1917 | *Silene acaulis* | Moss campion |
| 0920 208 | *Astragalus glycyphyllos* | Wild liquorice |
| 0920 1267 | *Melilotus officinalis* | Ribbed melilot |
| 0920 1641 | *Radiola linoides* | Allseed |
| 0920 2023 | *Symphytum asperum* | Rough comfrey |
| 0920 2145 | *Valerianella locusta* | Common cornsalad |
| 0920 2189 | *Vicia cracca* | Tufted vetch |
| 0910 586 | *Cryptogramma crispa* | Parsley fern |
| 0920 1475 | *Pimpinella major* | Greater burnet-saxifrage |
| 0920 1494 | *Poa alpina* | Alpine meadow-grass |
| 0920 1935 | *Sisymbrium altissimum* | Tall rocket |
| 0920 2165 | *Veronica arvensis* | Wall speedwell |
| 0920 2184 | *Viburnum lantana* | Wayfaring-tree |
| 0920 478 | *Cornus suecica* | Dwarf cornel |
| 0920 726 | *Erica cinerea* | Bell heather |
| 0920 1210 | *Lychnis flos-cuculi* | Ragged-robin |
| 0920 1294 | *Meum athamanticum* | Spignel |
| 0920 1819 | *Sanicula europaea* | Sanicle |
| 0920 1949 | *Solanum nigrum* | Black nightshade |
| 0920 2101 | *Triglochin maritimum* | Sea arrowgrass |
| 0910 248 | *Botrychium lunaria* | Moonwort |
| 0920 252 | *Brassica nigra* | Black mustard |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 619 | *Datura stramonium* | Thorn-apple |
| 0920 1911 | *Setaria viridis* | Green bristle-grass |
| 0920 2026 | *Symphytum orientale* | White comfrey |
| 0920 2074 | *Tragopogon pratensis* | Goat's-beard |
| 0920 1241 | *Tripleurospermum maritimum* sens.lat. | |
| 0910 194 | *Asplenium trichomanes* | Maidenhair spleenwort |
| 0920 1172 | *Listera cordata* | Lesser twayblade |
| 0920 1631 | *Pyrola minor* | Common wintergreen |
| 0920 1697 | *Ribes uva-crispa* | Gooseberry |
| 0920 1784 | *Salix alba* | White willow |
| 0910 1888 | *Selaginella selaginoides* | Lesser clubmoss |
| 0920 2112 | *Ulex europaeus* | Gorse |
| 0920 125 | *Anthriscus sylvestris* | Cow parsley |
| 0920 809 | *Fagopyrum esculentum* | Buckwheat |
| 0920 1727 | *Rubus chamaemorus* | Cloudberry |
| 0920 1742 | *Rumex crispus* | Curled dock |
| 0920 1867 | *Scrophularia nodosa* | Common figwort |
| 0920 2081 | *Trifolium dubium* | Lesser trefoil |
| 0920 256 | *Briza media* | Quaking-grass |
| 0920 291 | *Cakile maritima* | Sea rocket |
| 0920 918 | *Geranium robertianum* | Herb-robert |
| 0920 951 | *Hammarbya paludosa* | Bog orchid |
| 0920 1011 | *Hypericum humifusum* | Trailing St John's-wort |
| 0920 1023 | *Ilex aquifolium* | Holly |
| 0920 1960 | *Sorbus aucuparia* | Rowan |
| 0920 2049 | *Thalictrum minus* | Lesser meadow-rue |
| 0920 45 | *Ajuga pyramidalis* | Pyramidal bugle |
| 0920 465 | *Cerastium arcticum* | Arctic mouse-ear |
| 0920 992 | *Hordeum murinum* | Wall barley |
| 0920 2094 | *Trifolium scabrum* | Rough clover |
| 0920 2137 | *Vaccinium uliginosum* | Bog bilberry |
| 0920 232 | *Berberis vulgaris* | Barberry |
| 0920 450 | *Centaurium littorale* | Seaside centaury |
| 0920 929 | *Glaucium flavum* | Yellow horned-poppy |
| 0920 1410 | *Orthilia secunda* | Serrated wintergreen |
| 0920 1413 | *Oxalis acetosella* | Wood-sorrel |
| 0920 1695 | *Ribes spicatum* | Downy currant |
| 0920 1926 | *Silene uniflora* | Sea campion |
| 0920 2180 | *Veronica serpyllifolia* | Thyme-leaved speedwell |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 19 | *Adoxa moschatellina* | Moschatel |
| 0920 528 | *Clematis vitalba* | Traveller's-joy |
| 0920 574 | *Crepis mollis* | Northern hawk's-beard |
| 0920 1102 | *Lamium confertum* | Northern dead-nettle |
| 0920 1221 | *Lysimachia nemorum* | Yellow pimpernel |
| 0920 1233 | *Malva neglecta* | Dwarf mallow |
| 0920 1481 | *Pinguicula vulgaris* | Common butterwort |
| 0920 1504 | *Poa nemoralis* | Wood meadow-grass |
| 0920 1759 | *Ruppia cirrhosa* | Spiral tasselweed |
| 0920 1117 | *Lathyrus sylvestris* | Narrow-leaved everlasting-pea |
| 0920 1719 | *Rosa pimpinellifolia* | Burnet rose |
| 0920 1728 | *Rubus fruticosus* agg. | Bramble |
| 0920 2240 | *Zostera noltei* | Dwarf eelgrass |
| 0920 417 | *Carex saxatilis* | Russet sedge |
| 0920 506 | *Chrysosplenium oppositifolium* | Opposite-leaved golden-saxifrage |
| 0920 875 | *Cruciata laevipes* | Crosswort |
| 0920 836 | *Fragaria x ananassa* | Garden strawberry |
| 0920 921 | *Geranium sylvaticum* | Wood crane's-bill |
| 0920 943 | *Goodyera repens* | Creeping lady's-tresses |
| 0920 2047 | *Thalictrum alpinum* | Alpine meadow-rue |
| 0920 2140 | *Valeriana officinalis* | Common valerian |
| 0910 604 | *Cystopteris montana* | Mountain bladder-fern |
| 0920 1004 | *Hypericum calycinum* | Rose-of-Sharon |
| 0920 1104 | *Lapsana communis* | Nipplewort |
| 0920 2076 | *Trientalis europaea* | Chickweed-wintergreen |
| 0920 518 | *Cirsium heterophyllum* | Melancholy thistle |
| 0920 854 | *Fumaria officinalis* | Common fumitory |
| 0920 955 | *Helianthemum nummularium* | Common rock-rose |
| 0920 2136 | *Vaccinium myrtillus* | Bilberry |
| 0920 123 | *Anthriscus caucalis* | Bur chervil |
| 0920 293 | *Calamagrostis epigejos* | Wood small-reed |
| 0920 1247 | *Medicago arabica* | Spotted medick |
| 0920 1662 | *Ranunculus sardous* | Hairy buttercup |
| 0920 1794 | *Salix herbacea* | Dwarf willow |
| 0920 1874 | *Scutellaria minor* | Lesser skullcap |
| 0920 1899 | *Senecio jacobaea* | Common ragwort |
| 0920 2005 | *Stachys sylvatica* | Hedge woundwort |
| 0920 2009 | *Stellaria graminea* | Lesser stitchwort |
| 0920 2060 | *Thymus polytrichus* | Wild garden |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 2547 | *Cochlearia officinalis* sens.lat. | |
| 0920 1078 | *Juncus trifidus* | Three-leaved rush |
| 0920 1161 | *Linaria repens* | Pale toadflax |
| 0920 2066 | *Tofieldia pusilla* | Scottish asphodel |
| 0920 1118 | *Lathyrus tuberosus* | Tuberous pea |
| 0920 1375 | *Onobrychis viciifolia* | Sainfoin |
| 0920 2105 | *Trisetum flavescens* | Yellow oat-grass |
| 0920 2162 | *Veronica alpina* | Alpine speedwell |
| 0920 225 | *Ballota nigra* | Black horehound |
| 0910 1214 | *Lycopodium annotinum* | Interrupted clubmoss |
| 0910 1544 | *Polypodium vulgare* sens.lat. | |
| 0920 1991 | *Spergularia media* | Greater sea-spurrey |
| 0920 2010 | *Stellaria holostea* | Greater stitchwort |
| 0920 46 | *Ajuga reptans* | Bugle |
| 0920 444 | *Centaurea nigra* | Common knapweed |
| 0920 834 | *Filipendula vulgaris* | Dropwort |
| 0920 1333 | *Myrrhis odorata* | Sweet cicely |
| 0920 1393 | *Origanum vulgare* | Wild marjoram |
| 0920 7046 | *Papaver dubium* | Long-headed poppy |
| 0920 1604 | *Primula scotica* | Scottish primrose |
| 0920 5438 | *Pyrola rotundifolia* | Round-leaved wintergreen |
| 0920 1769 | *Sagina subulata* | Heath pearlwort |
| 0920 455 | *Centranthus ruber* | Red valerian |
| 0920 1080 | *Juniperus communis* | Common juniper |
| 0920 237 | *Stachys officinalis* | Betony |
| 0920 2070 | *Torilis nodosa* | Knotted hedge-parsley |
| 0920 596 | *Cynoglossum officinale* | Hound's-tongue |
| 0920 1822 | *Cytisus scoparius* | Broom |
| 0920 1188 | *Lonicera periclymenum* | Honeysuckle |
| 0920 1459 | *Phleum arenarium* | Sand cat's-tail |
| 0910 185 | *Asplenium adiantum-nigrum* sens.lat. | |
| 0920 658 | *Dryas octopetala* | Mountain avens |
| 0920 1072 | *Juncus maritimus* | Sea rush |
| 0920 1139 | *Lepidium heterophyllum* | Smith's pepperwort |
| 0920 1232 | *Malva moschata* | Musk-mallow |
| 0920 1765 | *Sagina maritima* | Sea pearlwort |
| 0910 192 | *Asplenium ruta-muraria* | Wall-rue |
| 0910 195 | *Asplenium viride* | Green spleenwort |
| 0920 384 | *Carex lachenalii* | Hare's-foot sedge |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 434 | *Catapodium marinum* | Sea fern-grass |
| 0920 1143 | *Ligusticum scoticum* | Scots lovage |
| 0920 1877 | *Sedum anglicum* | English stonecrop |
| 0920 464 | *Cerastium cerastoides* | Starwort mouse-ear |
| 0920 893 | *Genista tinctoria* | Dyer's greenweed |
| 0920 4313 | *Populus nigra* sens.lat. | Black-poplar |
| 0920 2150 | *Verbascum nigrum* | Dark mullein |
| 0920 250 | *Brachypodium sylvaticum* | False brome |
| 0920 329 | *Cardamine hirsuta* | Hairy bitter-cress |
| 0920 548 | *Cornus sanguinea* | Dogwood |
| 0920 630 | *Descurainia sophia* | Flixweed |
| 0920 33 | *Elytrigia repens* | Common couch |
| 0920 879 | *Galium mollugo* | Hedge bedstraw |
| 0920 1785 | *Salix arbuscula* | Mountain willow |
| 0920 2207 | *Viola canina* | Heath dog-violet |
| 0920 207 | *Astragalus danicus* | Purple milk-vetch |
| 0920 399 | *Carex pallescens* | Pale sedge |
| 0920 576 | *Crepis paludosa* | Marsh hawk's-beard |
| 0920 592 | *Cymbalaria muralis* | Ivy-leaved toadflax |
| 0920 1916 | *Silaum silaus* | Pepper-saxifrage |
| 0920 134 | *Apium graveolens* | Wild celery |
| 0920 645 | *Diplotaxis tenuifolia* | Perennial wall-rocket |
| 0920 753 | *Erophila verna* sens.lat. | |
| 0920 1352 | *Neottia nidus-avis* | Bird's-nest orchid |
| 0920 1957 | *Sorbus aria* agg. | |
| 0920 353 | *Carex capillaris* | Hair sedge |
| 0920 930 | *Glaux maritima* | Sea-milkwort |
| 0920 1587 | *Potentilla crantzii* | Alpine cinquefoil |
| 0920 1758 | *Ruppia maritima* | Beaked tasselweed |
| 0920 156 | *Arctostaphylos alpinus* | Alpine bearberry |
| 0920 767 | *Euphorbia cyparissias* | Cypress spurge |
| 0920 1304 | *Minuartia verna* | Spring sandwort |
| 0910 2053 | *Phegopteris connectilis* | Beech fern |
| 0920 1488 | *Plantago major* | Greater plantain |
| 0920 245 | *Blysmus compressus* | Flat-sedge |
| 0920 649 | *Doronicum plantagineum* | Plantain-leaved leopard's-bane |
| 0920 873 | *Galium aparine* | Cleavers |
| 0920 1440 | *Pastinaca sativa* | Wild parsnip |
| 0920 1803 | *Salix reticulata* | Net-leaved willow |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 229 | *Barbarea vulgaris* | Winter-cress |
| 0920 1622 | *Puccinellia maritima* | Common saltmarsh-grass |
| 0920 1730 | *Rubus saxatilis* | Stone bramble |
| 0920 1169 | *Linum catharticum* | Fairy flax |
| 0920 1305 | *Moehringia trinervia* | Three-nerved sandwort |
| 0920 1938 | *Sisymbrium officinale* | Hedge mustard |
| 0920 5486 | *Centaurium erythraea* | Common centaury |
| 0920 597 | *Cynosurus cristatus* | Crested dog's-tail |
| 0920 610 | *Dactylorhiza maculata* | Heath spotted-orchid |
| 0920 777 | *Euphorbia peplus* | Petty spurge |
| 0920 1116 | *Lathyrus pratensis* | Meadow vetchling |
| 0920 276 | *Bryonia dioica* | White bryony |
| 0920 690 | *Epilobium alsinifolium* | Chickweed willowherb |
| 0920 763 | *Eupatorium cannabinum* | Hemp-agrimony |
| 0920 349 | *Carex bigelowii* | Stiff sedge |
| 0920 380 | *Carex saxatilis x vesicaria (C. x grahamii)* | |
| 0920 1596 | *Potentilla sterilis* | Barren strawberry |
| 0920 2185 | *Viburnum opulus* | Guelder-rose |
| 0920 312 | *Calystegia soldanella* | Sea bindweed |
| 0920 316 | *Campanula latifolia* | Giant bellflower |
| 0920 337 | *Carduus nutans* | Musk thistle |
| 0920 1264 | *Melilotus albus* | White melilot |
| 0920 1378 | *Ononis spinosa* | Spiny restharrow |
| 0920 230 | *Bartsia alpina* | Alpine bartsia |
| 0920 627 | *Deschampsia cespitosa* | Tufted hair-grass |
| 0920 644 | *Diplotaxis muralis* | Annual wall-rocket |
| 0920 653 | *Draba norvegica* | Rock whitlowgrass |
| 0920 1220 | *Lysimachia ciliata* | Fringed loosestrife |
| 0920 1236 | *Malva sylvestris* | Common mallow |
| 0920 1422 | *Oxytropis halleri* | Purple oxytropis |
| 0920 1828 | *Saxifraga cespitosa* | Tufted saxifrage |
| 0920 2241 | *Aesculus hippocastanum* | Horse-chestnut |
| 0920 97 | *Ammophila arenaria* | Marram |
| 0920 823 | *Festuca pratensis* | Meadow fescue |
| 0910 1215 | *Lycopodium clavatum* | Stag's-horn clubmoss |
| 0920 1584 | *Potentilla anserina* | Silverweed |
| 0920 2239 | *Zostera marina* | Eelgrass |
| 0920 607 | *Dactylis glomerata* | Cock's-foot |
| 0910 660 | *Dryopteris aemula* | Hay-scented buckler-fern |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 914 | *Geranium pratense* | Meadow crane's-bill |
| 0920 1539 | *Polygonum oxyspermum* | Ray's knotgrass |
| 0920 1611 | *Prunus avium* | Wild cherry |
| 0920 1638 | *Quercus petraea* | Sessile oak |
| 0920 2125 | *Umbilicus rupestris* | Navelwort |
| 0920 2141 | *Valeriana pyrenaica* | Pyrenean valerian |
| 0920 1430 | *Papaver rhoeas* | Common poppy |
| 0920 23 | *Agrimonia procera* | Fragrant agrimony |
| 0920 335 | *Carduus crispus* | Welted thistle |
| 0920 1087 | *Koeleria macrantha* | Crested hair-grass |
| 0920 1485 | *Plantago coronopus* | Buck's-horn plantain |
| 0920 1952 | *Sonchus arvensis* | Perennial sow-thistle |
| 0920 7 | *Achillea millefolium* | Yarrow |
| 0920 530 | *Clinopodium vulgare* | Wild basil |
| 0920 240 | *Betula pubescens* | Downy birch |
| 0920 1056 | *Juncus biglumis* | Two-flowered rush |
| 0920 1525 | *Persicaria bistorta* | Common bistort |
| 0920 2077 | *Trifolium arvense* | Hare's-foot clover |
| 0920 126 | *Anthyllis vulneraria* | Kidney vetch |
| 0920 344 | *Carex arenaria* | Sand sedge |
| 0920 1945 | *Smyrnium olusatrum* | Alexanders |
| 0920 272 | *Bromopsis ramosa* | Hairy-brome |
| 0920 968 | *Heracleum sphondylium* | Hogweed |
| 0920 1625 | *Pulicaria dysenterica* | Common fleabane |
| 0920 113 | *Anisantha sterilis* | Barren brome |
| 0920 166 | *Armeria maritima* | Thrift |
| 0920 1149 | *Limonium humile* | Lax-flowered sea-lavender |
| 0920 110 | *Anisantha diandra* | Great brome |
| 0920 366 | *Carex distans* | Distant sedge |
| 0920 1028 | *Impatiens parviflora* | Small balsam |
| 0920 1471 | *Picris echioides* | Bristly oxtongue |
| 0920 2107 | *Tulipa sylvestris* | Wild tulip |
| 0920 2191 | *Vicia hirsuta* | Hairy tare |
| 0920 328 | *Cardamine flexuosa* | Wavy bitter-cress |
| 0920 346 | *Carex atrofusca* | Scorched alpine-sedge |
| 0920 513 | *Circaea lutetiana* | Enchanter's-nightshade |
| 0920 734 | *Erigeron borealis* | Alpine fleabane |
| 0920 1137 | *Lepidium ruderale* | Narrow-leaved pepperwort |
| 0920 1207 | *Luzula pilosa* | Hairy wood-rush |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1301 | *Minuartia rubella* | Mountain sandwort |
| 0920 1605 | *Primula veris* | Cowslip |
| 0920 556 | *Pseudofumaria lutea* | Yellow corydalis |
| 0920 1737 | *Rumex pseudoalpinus* | Monk's-rhubarb |
| 0920 2083 | *Trifolium fragiferum* | Strawberry clover |
| 0920 365 | *Carex dioica* | Dioecious sedge |
| 0920 700 | *Epilobium roseum* | Pale willowherb |
| 0920 1107 | *Lathraea squamaria* | Toothwort |
| 0920 1320 | *Myosotis ramosissima* | Early forget-me-not |
| 0920 1445 | *Petasites albus* | White butterbur |
| 0920 75 | *Allium ursinum* | Ramsons |
| 0920 1165 | *Linnaea borealis* | Twinflower |
| 0920 2028 | *Symphytum tuberosum* | Tuberous comfrey |
| 0920 744 | *Eriophorum vaginatum* | Hare's-tail cottongrass |
| 0920 1016 | *Hypericum tetrapterum* | Square-stalked St John's-wort |
| 0920 1489 | *Plantago maritima* | Sea plantain |
| 0920 1915 | *Danthonia decumbens* | Heath-grass |
| 0920 172 | *Seriphidium maritimum* | Sea wormwood |
| 0920 238 | *Betula nana* | Dwarf birch |
| 0920 640 | *Digitalis purpurea* | Foxglove |
| 0920 762 | *Euonymus europaeus* | Spindle |
| 0920 2222 | *Lychnis viscaria* | Sticky catchfly |
| 0920 1607 | *Primula vulgaris* | Primrose |
| 0920 1857 | *Scilla verna* | Spring squill |
| 0920 345 | *Carex atrata* | Black alpine-sedge |
| 0920 774 | *Euphorbia lathyris* | Caper spurge |
| 0920 887 | *Galium uliginosum* | Fen bedstraw |
| 0910 1411 | *Osmunda regalis* | Royal fern |
| 0920 1498 | *Poa chaixii* | Broad-leaved meadow-grass |
| 0920 1645 | *Ranunculus auricomus* | Goldilocks buttercup |
| 0920 1818 | *Sanguisorba officinalis* | Great burnet |
| 0920 1858 | *Trichophorum cespitosum* | Deergrass |
| 0910 193 | *Asplenium septentrionale* | Forked spleenwort |
| 0920 253 | *Brassica oleracea* | Cabbage |
| 0920 655 | *Drosera intermedia* | Oblong-leaved sundew |
| 0920 696 | *Epilobium obscurum* | Short-fruited willowherb |
| 0920 1308 | *Moneses uniflora* | One-flowered wintergreen |
| 0920 1449 | *Petroselinum crispum* | Garden parsley |
| 0920 1476 | *Pimpinella saxifraga* | Burnet-saxifrage |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1795 | *Salix lanata* | Woolly willow |
| 0920 617 | *Daphne laureola* | Spurge-laurel |
| 0920 684 | *Empetrum nigrum* | Crowberry |
| 0920 1617 | *Prunus spinosa* | Blackthorn |
| 0920 1802 | *Salix repens* | Creeping willow |
| 0920 1876 | *Sedum album* | White stonecrop |
| 0920 28 | *Elytrigia juncea* | Sand couch |
| 0920 1194 | *Lotus pedunculatus* | Greater bird's-foot-trefoil |
| 0920 2138 | *Vaccinium vitis-idaea* | Cowberry |
| 0920 2126 | *Urtica dioica* | Common nettle |
| 0920 2238 | *Zostera angustifolia* | Narrow-leaved eelgrass |
| 0920 609 | *Dactylorhiza incarnata* | Early marsh-orchid |
| 0920 670 | *Echium vulgare* | Viper's-bugloss |
| 0910 721 | *Equisetum telmateia* | Great horsetail |
| 0920 759 | *Erysimum cheiranthoides* | Treacle mustard |
| 0920 780 | *Euphorbia portlandica* | Portland spurge |
| 0920 1069 | *Juncus gerardii* | Saltmarsh rush |
| 0920 1089 | *Koenigia islandica* | Iceland-purslane |
| 0920 1345 | *Narthecium ossifragum* | Bog asphodel |
| 0920 1906 | *Serratula tinctoria* | Saw-wort |
| 0920 477 | *Chamerion angustifolium* | Rosebay willowherb |
| 0920 1173 | *Listera ovata* | Common twayblade |
| 0920 1189 | *Lonicera xylosteum* | Fly honeysuckle |
| 0920 2170 | *Veronica fruticans* | Rock speedwell |
| 0920 1760 | *Ruscus aculeatus* | Butcher's-broom |
| 0920 1800 | *Salix phylicifolia* | Tea-leaved willow |
| 0920 2174 | *Veronica peregrina* | American speedwell |
| 0920 423 | *Carex vaginata* | Sheathed sedge |
| 0920 7006 | *Elymus caninus* | Bearded couch |
| 0910 714 | *Equisetum hyemale* | Rough horsetail |
| 0920 1788 | *Salix caprea* | Goat willow |
| 0920 2226 | *Vulpia bromoides* | Squirreltail fescue |
| 0910 244 | *Blechnum spicant* | Hard-fern |
| 0920 657 | *Drosera rotundifolia* | Round-leaved sundew |
| 0920 731 | *Erica tetralix* | Cross-leaved heath |
| 0920 980 | *Hippophae rhamnoides* | Sea-buckthorn |
| 0920 996 | *Humulus lupulus* | Hop |
| 0920 1095 | *Lactuca virosa* | Great lettuce |
| 0920 1591 | *Potentilla norvegica* | Ternate-leaved cinquefoil |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 216 | *Atriplex laciniata* | Frosted orache |
| 0920 42 | *Aira praecox* | Early hair-grass |
| 0920 1027 | *Impatiens noli-tangere* | Touch-me-not balsam |
| 0910 189 | *Asplenium marinum* | Sea spleenwort |
| 0920 5396 | *Coincya monensis* | Isle-of-Man cabbage |
| 0920 1262 | *Melica nutans* | Mountain melick |
| 0920 2194 | *Vicia lathyroides* | Spring vetch |
| 0920 403 | *Carex magellanica* | Tall bog-sedge |
| 0920 1379 | *Onopordum acanthium* | Cotton thistle |
| 0920 1433 | *Parapholis strigosa* | Hard-grass |
| 0920 265 | *Bromopsis inermis* | Hungarian brome |
| 0910 2050 | *Gymnocarpium dryopteris* | Oak fern |
| 0920 1015 | *Hypericum pulchrum* | Slender St John's-wort |
| 0920 1799 | *Salix pentandra* | Bay willow |
| 0920 1838 | *Saxifraga rivularis* | Highland saxifrage |
| 0920 2007 | *Stellaria uliginosa* | Bog stitchwort |
| 0920 397 | *Carex ovalis* | Oval sedge |
| 0920 1610 | *Prunella vulgaris* | Selfheal |
| 0920 458 | *Cephalanthera longifolia* | Narrow-leaved helleborine |
| 0920 5051 | *Lycium* | |
| 0920 1793 | *Salix fragilis* | Crack-willow |
| 0920 6952 | *Arenaria norvegica* | Arctic sandwort |
| 0920 374 | *Carex extensa* | Long-bracted sedge |
| 0920 415 | *Carex rupestris* | Rock sedge |
| 0910 712 | *Equisetum arvense* | Field horsetail |
| 0920 1263 | *Melica uniflora* | Wood melick |
| 0920 5442 | *Sanguisorba minor* | Salad burnet |
| 0920 103 | *Andromeda polifolia* | Bog-rosemary |
| 0920 1452 | *Peucedanum ostruthium* | Masterwort |
| 0920 382 | *Carex hostiana* | Tawny sedge |
| 0910 2051 | *Oreopteris limbosperma* | Lemon-scented fern |
| 0920 228 | *Barbarea verna* | American winter-cress |
| 0920 1649 | *Ranunculus ficaria* | Lesser celandine |
| 0920 1707 | *Rosa arvensis* | Field-rose |
| 0920 1865 | *Scrophularia auriculata* | Water figwort |
| 0920 2195 | *Vicia lutea* | Yellow-vetch |
| 0920 565 | *Crambe maritima* | Sea-kale |
| 0920 1435 | *Parietaria judaica* | Pellitory-of-the-wall |
| 0910 2232 | *Woodsia alpina* | Alpine woodsia |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 950 | *Atriplex portulacoides* | Sea-purslane |
| 0920 410 | *Carex rariflora* | Mountain bog-sedge |
| 0920 702 | *Epipactis atrorubens* | Dark-red helleborine |
| 0920 963 | *Helleborus foetidus* | Stinking hellebore |
| 0920 1443 | *Pentaglottis sempervirens* | Green alkanet |
| 0920 2923 | *Sagina procumbens x saginoides (S. x normaniana)* | |
| 0920 67 | *Allium carinatum* | Keeled garlic |
| 0920 435 | *Catapodium rigidum* | Fern-grass |
| 0920 72 | *Allium schoenoprasum* | Chives |
| 0920 608 | *Dactylorhiza fuchsii* | Common spotted-orchid |
| 0920 845 | *Fumaria bastardii* | Tall ramping-fumitory |
| 0920 1506 | *Poa pratensis* sens.lat. | |
| 0910 473 | *Ceterach officinarum* | Rustyback |
| 0920 878 | *Galium saxatile* | Heath bedstraw |
| 0920 1077 | *Juncus tenuis* | Tender rush |
| 0920 1315 | *Mycelis muralis* | Wall lettuce |
| 0910 1546 | *Polystichum aculeatum* | Hard shield-fern |
| 0920 2559 | *Sagina apetala* | Annual pearlwort |
| 0920 917 | *Geranium pyrenaicum* | Hedgerow crane's-bill |
| 0920 4444 | *Oenothera* | |
| 0920 2205 | *Vinca minor* | Lesser periwinkle |
| 0920 71 | *Allium scorodoprasum* | Sand leek |
| 0920 333 | *Lepidium draba* | Hoary cress |
| 0920 1154 | *Limonium vulgare* | Common sea-lavender |
| 0920 1209 | *Luzula sylvatica* | Great wood-rush |
| 0920 1434 | *Parentucellia viscosa* | Yellow bartsia |
| 0920 1789 | *Salix cinerea* | Grey willow |
| 0920 2158 | *Verbascum virgatum* | Twiggy mullein |
| 0920 2171 | *Veronica hederifolia* | Ivy-leaved speedwell |
| 0920 98 | *Anacamptis pyramidalis* | Pyramidal orchid |
| 0920 355 | *Carex caryophyllea* | Spring-sedge |
| 0920 432 | *Castanea sativa* | Sweet chestnut |
| 0920 724 | *Eranthis hyemalis* | Winter aconite |
| 0920 920 | *Geranium sanguineum* | Bloody crane's-bill |
| 0920 1993 | *Spergularia rupicola* | Rock sea-spurrey |
| 0920 2039 | *Taxus baccata* | Yew |
| 0920 1519 | *Polygonatum verticillatum* | Whorled Solomon's-seal |
| 0920 859 | *Gagea lutea* | Yellow Star-of-Bethlehem |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 169 | *Arrhenatherum elatius* | False oat-grass |
| 0920 405 | *Carex pilulifera* | Pill sedge |
| 0920 428 | *Carpinus betulus* | Hornbeam |
| 0920 1119 | *Lavatera arborea* | Tree-mallow |
| 0920 1593 | *Potentilla recta* | Sulphur cinquefoil |
| 0920 2021 | *Succisa pratensis* | Devil's-bit scabious |
| 0920 1446 | *Petasites fragrans* | Winter heliotrope |
| 0920 101 | *Anaphalis margaritacea* | Pearly everlasting |
| 0920 1499 | *Poa compressa* | Flattened meadow-grass |
| 0920 1801 | *Salix purpurea* | Purple willow |
| 0920 431 | *Carum verticillatum* | Whorled caraway |
| 0920 984 | *Holcus mollis* | Creeping soft-grass |
| 0920 1397 | *Ornithopus perpusillus* | Bird's-foot |
| 0920 1531 | *Persicaria lapathifolia* | Pale persicaria |
| 0920 462 | *Cerastium diffusum* | Sea mouse-ear |
| 0920 835 | *Foeniculum vulgare* | Fennel |
| 0920 1366 | *Oenanthe lachenalii* | Parsley water-dropwort |
| 0920 1583 | *Potentilla anglica* | Trailing tormentil |
| 0920 1881 | *Sedum rupestre* | Reflexed stonecrop |
| 0920 456 | *Anagallis minima* | Chaffweed |
| 0920 1748 | *Rumex obtusifolius* | Broad-leaved dock |
| 0920 2014 | *Stellaria nemorum* | Wood stitchwort |
| 0920 408 | *Carex pulicaris* | Flea sedge |
| 0920 682 | *Leymus arenarius* | Lyme-grass |
| 0920 628 | *Deschampsia flexuosa* | Wavy hair-grass |
| 0920 1203 | *Luzula luzuloides* | White wood-rush |
| 0920 1616 | *Prunus padus* | Bird cherry |
| 0920 1642 | *Ranunculus acris* | Meadow buttercup |
| 0910 210 | *Athyrium distentifolium* | Alpine lady-fern |
| 0920 281 | *Bunias orientalis* | Warty-cabbage |
| 0920 1396 | *Ornithogalum angustifolium* | Star-of-Bethlehem |
| 0920 1830 | *Saxifraga granulata* | Meadow saxifrage |
| 0920 466 | *Cerastium glomeratum* | Sticky mouse-ear |
| 0920 2097 | *Trifolium striatum* | Knotted clover |
| 0920 412 | *Carex remota* | Remote sedge |
| 0920 1821 | *Saponaria officinalis* | Soapwort |
| 0920 1903 | *Senecio sylvaticus* | Heath groundsel |
| 0920 176 | *Arum maculatum* | Lords-and-Ladies |
| 0920 323 | *Campanula trachelium* | Nettle-leaved bellflower |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1010 | *Hypericum hirsutum* | Hairy St John's-wort |
| 0920 1131 | *Leontodon saxatilis* | Lesser hawkbit |
| 0920 1344 | *Nardus stricta* | Mat-grass |
| 0920 1904 | *Senecio viscosus* | Sticky groundsel |
| 0920 648 | *Doronicum pardalianches* | Leopard's-bane |
| 0920 2202 | *Vicia tetrasperma* | Smooth tare |
| 0920 385 | *Carex laevigata* | Smooth-stalked sedge |
| 0920 515 | *Cirsium arvense* | Creeping thistle |
| 0920 525 | *Claytonia perfoliata* | Springbeauty |
| 0920 479 | *Erysimum cheiri* | Wallflower |
| 0920 1020 | *Hypochaeris radicata* | Cat's-ear |
| 0920 64 | *Alliaria petiolata* | Garlic mustard |
| 0920 938 | *Gnaphalium norvegicum* | Highland cudweed |
| 0920 1508 | *Polemonium caeruleum* | Jacob's-ladder |
| 0920 2561 | *Ranunculus flammula x reptans (R. x levenensis)* | |
| 0920 1660 | *Ranunculus repens* | Creeping buttercup |
| 0920 1672 | *Reseda lutea* | Wild mignonette |
| 0920 2063 | *Tilia cordata* | Small-leaved lime |
| 0920 2228 | *Vulpia myuros* | Rat's-tail fescue |
| 0920 251 | *Brassica napus* | Rape |
| 0920 522 | *Cirsium vulgare* | Spear thistle |
| 0920 635 | *Dianthus deltoides* | Maiden pink |
| 0920 962 | *Helictotrichon pubescens* | Downy oat-grass |
| 0910 1466 | *Phyllitis scolopendrium* | Hart's-tongue |
| 0920 142 | *Arabidopsis thaliana* | Thale cress |
| 0920 231 | *Bellis perennis* | Daisy |
| 0920 555 | *Ceratocapnos claviculata* | Climbing corydalis |
| 0920 1325 | *Myosotis sylvatica* | Wood forget-me-not |
| 0920 331 | *Cardamine pratensis* | Cuckooflower |
| 0920 469 | *Cerastium semidecandrum* | Little mouse-ear |
| 0920 826 | *Festuca vivipara* | Viviparous sheep's-fescue |
| 0920 2204 | *Vinca major* | Greater periwinkle |
| 0920 40 | *Agrostis capillaris* | Common bent |
| 0920 520 | *Cirsium palustre* | Marsh thistle |
| 0920 545 | *Corallorhiza trifida* | Coralroot orchid |
| 0920 1693 | *Ribes alpinum* | Mountain currant |
| 0920 167 | *Armoracia rusticana* | Horse-radish |
| 0920 1538 | *Persicaria wallichii* | Himalayan knotweed |
| 0920 3 | *Acer campestre* | Field maple |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1846 | *Scabiosa columbaria* | Small scabious |
| 0920 421 | *Carex sylvatica* | Wood-sedge |
| 0920 1239 | *Matricaria recutita* | Scented mayweed |
| 0920 1870 | *Scrophularia vernalis* | Yellow figwort |
| 0920 1628 | *Pulmonaria officinalis* | Lungwort |
| 0920 743 | *Eriophorum latifolium* | Broad-leaved cottongrass |
| 0920 1145 | *Lilium martagon* | Martagon lily |
| 0920 1307 | *Molinia caerulea* | Purple moor-grass |
| 0920 1285 | *Mentha spicata* | Spear mint |
| 0920 1514 | *Polygala serpyllifolia* | Heath milkwort |
| 0910 211 | *Athyrium filix-femina* | Lady-fern |
| 0920 652 | *Draba muralis* | Wall whitlowgrass |
| 0920 1100 | *Lamium hybridum* | Cut-leaved dead-nettle |
| 0920 816 | *Festuca gigantea* | Giant fescue |
| 0920 1753 | *Rumex sanguineus* | Wood dock |
| 0920 1495 | *Poa annua* | Annual meadow-grass |
| 0920 1637 | *Quercus ilex* | Evergreen oak |
| 0920 1129 | *Leontodon autumnalis* | Autumn hawkbit |
| 0920 2034 | *Taraxacum* | Dandelion |
| 0920 512 | *Circaea alpina x lutetiana (C. x intermedia)* | |
| 0910 661 | *Dryopteris dilatata* | Broad buckler-fern |
| 0920 80 | *Alopecurus borealis* | Alpine foxtail |
| 0920 217 | *Atriplex littoralis* | Grass-leaved orache |
| 0920 909 | *Geranium lucidum* | Shining crane's-bill |
| 0920 1869 | *Scrophularia umbrosa* | Green figwort |
| 0920 1036 | *Iris foetidissima* | Stinking iris |
| 0920 2157 | *Verbascum thapsus* | Great mullein |
| 0920 220 | *Avena fatua* | Wild-oat |
| 0920 311 | *Calystegia sepium* | Hedge bindweed |
| 0920 1833 | *Saxifraga hirsuta* | Kidney saxifrage |
| 0920 965 | *Soleirolia soleirolii* | Mind-your-own-business |
| 0920 1555 | *Populus tremula* | Aspen |
| 0920 1003 | *Hypericum androsaemum* | Tutsan |
| 0920 1196 | *Lupinus arboreus* | Tree lupin |
| 0920 381 | *Carex hirta* | Hairy sedge |
| 0920 849 | *Fumaria densiflora* | Dense-flowered fumitory |
| 0920 961 | *Helictotrichon pratense* | Meadow oat-grass |
| 0920 76 | *Allium vineale* | Wild onion |
| 0920 127 | *Antirrhinum majus* | Snapdragon |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 533 | *Cochlearia danica* | Danish scurvygrass |
| 0920 1507 | *Poa trivialis* | Rough meadow-grass |
| 0920 327 | *Cardamine amara* | Large bitter-cress |
| 0920 613 | *Dactylorhiza purpurella* | Northern marsh-orchid |
| 0920 2058 | *Thlaspi arvense* | Field penny-cress |
| 0920 908 | *Geranium endressii* | French crane's-bill |
| 0920 1419 | *Vaccinium oxycoccos* | Cranberry |
| 0920 309 | *Calluna vulgaris* | Heather |
| 0920 812 | *Festuca altissima* | Wood fescue |
| 0920 674 | *Eleocharis multicaulis* | Many-stalked spike-rush |
| 0920 1230 | *Malus sylvestris* sens.lat. | |
| 0920 505 | *Chrysosplenium alternifolium* | Alternate-leaved golden-saxifrage |
| 0920 319 | *Campanula persicifolia* | Peach-leaved bellflower |
| 0920 883.2 | *Galium sterneri* | Limestone bedstraw |
| 0920 3313 | *Cotoneaster microphyllus* agg. | |
| 0920 1734 | *Rumex acetosa* | Common sorrel |
| 0920 2113 | *Ulex gallii* | Western gorse |
| 0920 1296 | *Milium effusum* | Wood millet |
| 0920 1787 | *Salix aurita* | Eared willow |
| 0920 1767 | *Sagina procumbens* | Procumbent pearlwort |
| 0920 1953 | *Sonchus asper* | Prickly sow-thistle |
| 0920 705 | *Epipactis helleborine* | Broad-leaved helleborine |
| 0920 551 | *Coronopus didymus* | Lesser swine-cress |
| 0920 363 | *Carex diandra* | Lesser tussock-sedge |
| 0920 692 | *Epilobium hirsutum* | Great willowherb |
| 0920 697 | *Epilobium palustre* | Marsh willowherb |
| 0920 1191 | *Lotus corniculatus* | Common bird's-foot-trefoil |
| 0920 1673 | *Reseda luteola* | Weld |
| 0920 1816 | *Sambucus racemosa* | Red-berried elder |
| 0920 1861 | *Scirpus sylvaticus* | Wood club-rush |
| 0920 1418 | *Vaccinium microcarpum* | Small cranberry |
| 0920 1228 | *Mahonia aquifolium* | Oregon-grape |
| 0920 2022 | *Symphoricarpos albus* | Snowberry |
| 0920 376 | *Carex flacca* | Glaucous sedge |
| 0920 975 | *Hesperis matronalis* | Dame's-violet |
| 0920 813 | *Festuca arundinacea* | Tall fescue |
| 0920 1704 | *Rorippa sylvestris* | Creeping yellow-cress |
| 0920 1541 | *Fallopia sachalinensis* | Giant knotweed |
| 0920 1487 | *Plantago lanceolata* | Ribwort plantain |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1222 | *Lysimachia nummularia* | Creeping-jenny |
| 0920 367 | *Carex disticha* | Brown sedge |
| 0920 467 | *Cerastium fontanum* | Common mouse-ear |
| 0920 254 | *Brassica rapa* | Turnip |
| 0920 857 | *Fumaria purpurea* | Purple ramping-fumitory |
| 0920 359 | *Carex curta* | White sedge |
| 0920 1431 | *Papaver somniferum* | Opium poppy |
| 0920 35 | *Agrostis canina* sens.lat. | |
| 0920 1588 | *Potentilla erecta* | Tormentil |
| 0920 1884 | *Sedum spurium* | Caucasian-stonecrop |
| 0920 2008 | *Stellaria pallida* | Lesser chickweed |
| 0920 2092 | *Trifolium repens* | White clover |
| 0920 1528 | *Fallopia japonica* | Japanese knotweed |
| 0920 496 | *Chenopodium rubrum* | Red goosefoot |
| 0910 1548 | *Polystichum setiferum* | Soft shield-fern |
| 0920 1879 | *Sedum forsterianum* | Rock stonecrop |
| 0920 121 | *Anthoxanthum odoratum* | Sweet vernal-grass |
| 0920 350 | *Carex binervis* | Green-ribbed sedge |
| 0910 1381 | *Ophioglossum vulgatum* sens.lat. | |
| 0920 289 | *Buxus sempervirens* | Box |
| 0920 1994 | *Spiraea* | |
| 0920 1687 | *Rhododendron ponticum* | Rhododendron |
| 0920 1635 | *Quercus cerris* | Turkey oak |
| 0920 1902 | *Senecio squalidus* | Oxford ragwort |
| 0920 141 | *Aquilegia vulgaris* | Columbine |
| 0920 470 | *Cerastium tomentosum* | Snow-in-summer |
| 0920 1551 | *Populus alba x tremula (P. x canescens)* | |
| 0920 2172 | *Veronica montana* | Wood speedwell |
| 0920 69 | *Allium paradoxum* | Few-flowered garlic |
| 0920 646 | *Dipsacus fullonum* sens.lat. | |
| 0920 983 | *Holcus lanatus* | Yorkshire-fog |
| 0920 1204 | *Luzula multiflora* | Heath wood-rush |
| 0920 524 | *Claytonia sibirica* | Pink purslane |
| 0920 2169 | *Veronica filiformis* | Slender speedwell |
| 0920 738 | *Erinus alpinus* | Fairy foxglove |
| 0920 844 | *Fuchsia magellanica* | Fuchsia |
| 0920 1006 | *Hypericum maculatum* | Imperforate St John's-wort |
| 0920 404 | *Carex pendula* | Pendulous sedge |
| 0920 1992 | *Spergularia rubra* | Sand spurrey |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1694 | *Ribes nigrum* | Black currant |
| 0920 36 | *Agrostis gigantea* | Black bent |
| 0920 1614 | *Prunus domestica* | Wild plum |
| 0920 1797 | *Salix myrsinifolia* | Dark-leaved willow |
| 0920 1703 | *Rorippa palustris* | Marsh yellow-cress |
| 0920 2064 | *Tilia platyphyllos* | Large-leaved lime |
| 0920 1746 | *Rumex longifolius* | Northern dock |
| 0920 1246 | *Meconopsis cambrica* | Welsh poppy |
| 0910 666 | *Dryopteris carthusiana* | Narrow buckler-fern |
| 0920 2218 | *Viola riviniana* | Common dog-violet |
| 0920 824 | *Festuca rubra* agg. | |
| 0920 1696 | *Ribes rubrum* | Red currant |
| 0920 941 | *Gnaphalium uliginosum* | Marsh cudweed |
| 0920 860 | *Galanthus nivalis* | Snowdrop |
| 0920 1091 | *Laburnum anagyroides* | Laburnum |
| 0920 7292 | *Epilobium tetragonum* | Square-stalked willowherb |
| 0920 2266 | *Calystegia pulchra* | Hairy bindweed |
| 0920 226 | *Barbarea intermedia* | Medium-flowered winter-cress |
| 0920 850 | *Fumaria muralis* | Common ramping-fumitory |
| 0920 2029 | *Syringa vulgaris* | Lilac |
| 0920 1160 | *Linaria purpurea* | Purple toadflax |
| 0920 1620 | *Puccinellia distans* | Reflexed saltmarsh-grass |
| 0920 277 | *Buddleja davidii* | Butterfly-bush |
| 0920 1990 | *Spergularia marina* | Lesser sea-spurrey |
| 0920 1105 | *Larix decidua* | European larch |
| 0920 1615 | *Prunus laurocerasus* | Cherry laurel |
| 0920 862 | *Lamiastrum galeobdolon* | Yellow archangel |
| 0920 563 | *Cotoneaster simonsii* | Himalayan cotoneaster |
| 0920 580 | *Crocosmia aurea x pottsii (C. x crocosmiiflora)* | |
| 0920 699 | *Epilobium brunnescens* | New Zealand willowherb |
| 0920 1223 | *Lysimachia punctata* | Dotted loosestrife |
| 0920 688 | *Epilobium ciliatum* | American willowherb |
| 0920 35.2 | *Agrostis canina* | Velvet bent |
| 0920 35.1 | *Agrostis vinealis* | Brown bent |
| 0920 4480 | *Alchemilla filicaulis* | Hairy Lady's-mantle |
| 0920 51 | *Alchemilla glabra* | Smooth Lady's-mantle |
| 0920 54 | *Alchemilla glaucescens* | |
| 0920 52 | *Alchemilla glomerulans* | |
| 0920 59 | *Alchemilla wichurae* | |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 60 | *Alchemilla xanthochlora* | Intermediate Lady's-mantle |
| 0920 132 | *Aphanes arvensis* | Parsley-piert |
| 0920 133 | *Aphanes australis* | Slender parsley-piert |
| 0920 143 | *Arabis alpina* | Alpine rock-cress |
| 0920 2108 | *Arabis glabra* | Tower mustard |
| 0920 2264 | *Artemisia norvegica* | Norwegian mugwort |
| 0910 185.1 | *Asplenium adiantum-nigrum* | Black spleenwort |
| 0910 191 | *Asplenium obovatum* | Lanceolate spleenwort |
| 0920 206 | *Astragalus alpinus* | Alpine milk-vetch |
| 0910 210.1 | *Athyrium flexile* | Newman's Lady-fern |
| 0920 212 | *Atriplex glabriuscula* | Babington's orache |
| 0920 2286 | *Atriplex longipes* | Long-stalked orache |
| 0920 2287 | *Atriplex praecox* | Early orache |
| 0920 214 | *Atriplex prostrata* | Spear-leaved orache |
| 0920 235 | *Beta vulgaris* | Beet |
| 0920 259 | *Bromopsis benekenii* | Lesser hairy-brome |
| 0920 292 | *Calamagrostis canescens* | Purple small-reed |
| 0920 4520 | *Carex divulsa* | Grey sedge |
| 0920 390 | *Carex microglochin* | Bristle sedge |
| 0920 398 | *Carex muricata* | Prickly sedge |
| 0920 394 | *Carex norvegica* | Close-headed alpine-sedge |
| 0920 409 | *Carex punctata* | Dotted sedge |
| 0920 357 | *Carex spicata* | Spiked sedge |
| 0920 420 | *Carex strigosa* | Thin-spiked wood-sedge |
| 0920 453 | *Centaurium pulchellum* | Lesser centaury |
| 0920 465.1 | *Cerastium nigrescens* | Shetland mouse-ear |
| 0920 508 | *Cicerbita alpina* | Alpine blue-sow-thistle |
| 0920 511 | *Circaea alpina* | Alpine enchanter's-nightshade |
| 0920 516 | *Cirsium dissectum* | Meadow thistle |
| 0920 534 | *Cochlearia micacea* | Mountain scurvygrass |
| 0920 535 | *Cochlearia officinalis* | Common scurvygrass |
| 0920 5422 | *Cochlearia pyrenaica* | Pyrenean scurvygrass |
| 0910 602 | *Cystopteris dickieana* | Dickie's bladder-fern |
| 0920 2964 | *Dactylorhiza lapponica* | Lapland marsh-orchid |
| 0920 614 | *Dactylorhiza traunsteineri* | Narrow-leaved marsh-orchid |
| 0920 639 | *Diapensia lapponica* | Diapensia |
| 0910 2277 | *Diphasiastrum complanatum* | Issler's clubmoss |
| 0910 662 | *Dryopteris affinis* | Scaly male-fern |
| 0910 663 | *Dryopteris cristata* | Crested buckler-fern |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0910 2274 | *Dryopteris expansa* | Northern buckler-fern |
| 0910 665 | *Dryopteris filix-mas* | Male-fern |
| 0910 659 | *Dryopteris oreades* | Mountain male-fern |
| 0910 2499 | *Dryopteris remota* | Scaly buckler-fern |
| 0910 667 | *Dryopteris submontana* | Rigid buckler-fern |
| 0920 32 | *Elytrigia atherica* | Sea couch |
| 0920 5476 | *Epipactis leptochila* | Narrow-lipped helliborine |
| 0920 708 | *Epipactis palustris* | Marsh helleborine |
| 0920 2549 | *Epipactis youngiana* | Young's helleborine |
| 0920 746 | *Erodium cicutarium* | Common stork's-bill |
| 0920 747 | *Erodium lebelii* | Sticky stork's-bill |
| 0920 748 | *Erodium maritimum* | Sea stork's-bill |
| 0920 4343 | *Erophila glabrescens* | Glabrous whitlowgrass |
| 0920 4344 | *Erophila majuscula* | Hairy whitlowgrass |
| 0920 4342 | *Erophila verna* sensu *Stace* | Common whitlowgrass |
| 0920 775 | *Euphorbia paralias* | Sea spurge |
| 0920 783 | *Euphrasia anglica* | |
| 0920 7310 | *Euphrasia arctica* | |
| 0920 787 | *Euphrasia campbelliae* | |
| 0920 788 | *Euphrasia confusa* | |
| 0920 791 | *Euphrasia foulaensis* | |
| 0920 792 | *Euphrasia frigida* | |
| 0920 793 | *Euphrasia heslop-harrisonii* | |
| 0920 795 | *Euphrasia marshallii* | |
| 0920 796 | *Euphrasia micrantha* | |
| 0920 798 | *Euphrasia nemorosa* | |
| 0920 789 | *Euphrasia ostenfeldii* | |
| 0920 7351 | *Euphrasia rostkoviana* | |
| 0920 805 | *Euphrasia rotundifolia* | |
| 0920 807 | *Euphrasia scottica* | |
| 0920 799 | *Euphrasia tetraquetra* | |
| 0920 819 | *Festuca arenaria* | Rush-leaved fescue |
| 0920 822.2 | *Festuca filiformis* | Fine-leaved sheep's-fescue |
| 0920 822 | *Festuca ovina* | Sheep's-fescue |
| 0920 839 | *Frangula alnus* | Alder buckthorn |
| 0920 864 | *Galeopsis bifida* | Bifid hemp-nettle |
| 0920 869 | *Galeopsis tetrahit* | Common hemp-nettle |
| 0920 894 | *Gentiana nivalis* | Alpine gentian |
| 0910 2054 | *Gymnocarpium robertianum* | Limestone fern |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 2560 | *Hieracium* | |
| 0920 989 | *Hordelymus europaeus* | Wood barley |
| 0920 991 | *Hordeum marinum* | Sea barley |
| 0920 994 | *Hornungia petraea* | Hutchinsia |
| 0920 1014 | *Hypericum perforatum* | Perforate St John's-wort |
| 0920 1030 | *Inula conyzae* | Ploughman's-spikenard |
| 0920 1031 | *Inula crithmoides* | Golden-samphire |
| 0920 1057.1 | *Juncus ambiguus* | Frog rush |
| 0920 1057.3 | *Juncus foliosus* | Leafy rush |
| 0920 1075 | *Juncus squarrosus* | Heath rush |
| 0920 1085 | *Kobresia simpliciuscula* | False sedge |
| 0920 1110 | *Lathyrus japonicus* | Sea pea |
| 0920 1152 | *Limonium recurvum* | |
| 0920 1167 | *Linum perenne* | Perennial flax |
| 0920 1193 | *Lotus glaber* | Narrow-leaved bird's-foot-trefoil |
| 0920 2221 | *Lychnis alpina* | Alpine catchfly |
| 0920 1310 | *Monotropa hypopitys* | Yellow bird's-nest |
| 0920 1376 | *Ononis reclinata* | Small restharrow |
| 0910 1381.1 | *Ophioglossum azoricum* | Small adder's-tongue |
| 0910 1381.2 | *Ophioglossum vulgatum* | Adder's-tongue |
| 0920 1389 | *Orchis morio* | Green-winged orchid |
| 0920 1402 | *Orobanche hederae* | Ivy broomrape |
| 0920 1408 | *Orobanche rapum-genistae* | Greater broomrape |
| 0920 1421 | *Oxytropis campestris* | Yellow oxytropis |
| 0920 1461 | *Phleum bertolonii* | Smaller cat's-tail |
| 0920 1463 | *Phleum pratense* | Timothy |
| 0920 1467 | *Phyllodoce caerulea* | Blue heath |
| 0920 3083 | *Pilosella flagellaris* | Shetland mouse-ear-hawkweed |
| 0920 1477 | *Pinguicula alpina* | Alpine butterwort |
| 0920 1506.2 | *Poa angustifolia* | Narrow-leaved meadow-grass |
| 0920 1500 | *Poa flexuosa* | Wavy meadow-grass |
| 0920 1506.5 | *Poa humilis* | Spreading meadow-grass |
| 0920 1506.4 | *Poa pratensis sens.str.* | Smooth meadow-grass |
| 0920 1523 | *Polygonum aviculare* | Knotgrass |
| 0920 2269 | *Polygonum boreale* | Northern knotgrass |
| 0910 1544.1 | *Polypodium cambricum* | Southern polypody |
| 0910 1544.3 | *Polypodium interjectum* | Intermediate polypody |
| 0910 1544.2 | *Polypodium vulgare* | Polypody |
| 0920 1595 | *Potentilla rupestris* | Rock cinquefoil |

**Appendix 1** *(continued)*

| Agg. Code | Name | Common name |
|---|---|---|
| 0920 1603 | *Primula farinosa* | Bird's-eye primrose |
| 0920 1347 | *Rorippa nasturtium-aquaticum* | Water-cress |
| 0920 7533 | *Rosa caesia* | |
| 0920 1709 | *Rosa canina* sens.str. | Dog-rose |
| 0920 1712 | *Rosa micrantha* | Small-flowered sweet-briar |
| 0920 1723 | *Rosa mollis* | Soft downy-rose |
| 0920 1715 | *Rosa rubiginosa* | Sweet-briar |
| 0920 1718 | *Rosa sherardii* | Sherard's downy-rose |
| 0920 1721 | *Rosa tomentosa* | Harsh downy-rose |
| 0920 2293 | *Rubus arcticus* | Arctic bramble |
| 0920 1749 | *Rumex palustris* | Marsh dock |
| 0920 1764 | *Sagina nivalis* | Snow pearlwort |
| 0920 1774 | *Salicornia dolichostachya* | Long-spiked glasswort |
| 0920 1775 | *Salicornia europaea* | Common glasswort |
| 0920 1776 | *Salicornia fragilis* | Yellow glasswort |
| 0920 1778 | *Salicornia nitens* | Shiny glasswort |
| 0920 1781 | *Salicornia ramosissima* | Purple glasswort |
| 0920 1812 | *Salvia verbenaca* | Wild clary |
| 0920 1777 | *Sarcocornia perennis* | Perennial glasswort |
| 0920 1827 | *Saxifraga cernua* | Drooping saxifrage |
| 0920 2294 | *Senecio cambrensis* | Welsh groundsel |
| 0920 1921 | *Silene conica* | Sand catchfly |
| 0920 1928 | *Silene nutans* | Nottingham catchfly |
| 0920 1959 | *Sorbus arranensis* | |
| 0920 1973 | *Sorbus pseudofennica* | Arran service-tree |
| 0920 1974 | *Sorbus rupicola* | Rock whitebeam |
| 0920 2012 | *Stellaria media* | Common chickweed |
| 0920 2024 | *Symphytum officinale* | Common comfrey |
| 0920 2048 | *Thalictrum flavum* | Common meadow-rue |
| 0920 2057 | *Thlaspi caerulescens* | Alpine penny-cress |
| 0920 2061 | *Thymus pulegioides* | Large garden |
| 0920 1859 | *Trichophorum alpinum* | Cotton deergrass |
| 0920 2088 | *Trifolium micranthum* | Slender trefoil |
| 0920 1241.3 | *Tripleurospermum maritimum* | Sea mayweed |
| 0920 2133 | *Utricularia vulgaris* sens.str. | Greater bladderwort |
| 0920 2187 | *Vicia bithynica* | Bithynian vetch |
| 0920 2516 | *Vicia sativa* | Common vetch |
| 0910 2233 | *Woodsia ilvensis* | Oblong woodsia |

## APPENDIX 2 TRENDS AT A GLANCE

| Habitat type | Trends | Decreasing[1] | Static[2] | Increasing[3] | Recording bias[4] |
|---|---|---|---|---|---|
| **Uplands** | Native species | 32% ↓ | 58% | 11% ↑ | N |
| | Non-native species | 20% ↓ | | 80% ↑ | N |
| | All species | 31% ↓ | 56% | 13% ↑ | N |
| **Grasslands** | Native species | 33% ↓ | 45% | 22% ↑ | N |
| | Non-native species | 56% ↓ | 28% | 16% ↑ | N |
| | All species | 36% ↓ | 43% | 21% ↑ | N |
| **Woodlands** | Native species | 25% ↓ | 53% | 22% ↑ | N |
| | Non-native species | 14% ↓ | 37% | 49% ↑ | N |
| | All species | 21% ↓ | 48% | 31% ↑ | N |
| **Freshwater** | Native species | 3% ↓ | 34% | 62% ↑ | Y |
| **Freshwater** | Non-native species | 31% ↓ | 31% | 38% ↑ | ?N |
| **Arable weeds** | Native species | 48% ↓ | 24% | 28% ↑ | N |
| | Non-native species | 59% ↓ | 24% | 17% ↑ | N |
| | All species | 56% ↓ | 24% | 19% ↑ | N |
| **Coastal species** | Native species | 15% ↓ | 76% | 9% ↑ | N |
| | Non-native species | 10% ↓ | 65% | 25% ↑ | N |
| | All species | 14% ↓ | 74% | 12% ↑ | N |
| **Built-up areas and gardens** | Native species | 24% ↓ | 57% | 19% ↑ | N |
| | Non-native species | 28% ↓ | 37% | 35% ↑ | N |
| | All species | 27% ↓ | 40% | 33% ↑ | N |

**Appendix 2** *(continued)*

| Habitat type | Trends | Decreasing[1] | Static[2] | Increasing[3] | Recording bias[4] |
|---|---|---|---|---|---|
| **Linear and boundary features** | Native species | 28% ↓ | 50% | 21% ↑ | N |
| | Non-native species | 29% ↓ | 40% | 31% ↑ | N |
| | All species | 29% ↓ | 44% | 27% ↑ | N |
| **Base-poor substrates** | Native species | 27% ↓ | 58% | 18% ↑ | N |
| | Non-native species | | | 100% ↑ | N |
| | All species | 26% ↓ | 54% | 20% ↑ | N |

Notes

1. If the decreasing species is the largest single category in a row it is shaded pink; if the increasing species is the largest single category it is shaded blue. These shadings are omitted if the results are subject to recording bias.
2. Indicates little or no change.
3. There is no 'data insufficient' category for the non-native species because it is not possible to quantify the non-native element in the Scottish flora.
4. 'Y' would indicate recording bias; N indicates that no such bias is known.